VOL. 161 — NO. 9

AUGUST 26, 1961

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

Mobile unit entered by the Lorain (Ohio) Telephone Co. in the Steelmark Days parade and celebration held in Lorain. Salute to the men who make steel is sponsored by U. S. Steel Corp. in cities where the company has steel plants. On the side of the truck are the various steel items that the Lorain company uses. A crowd estimated at 50,000 viewed the parade.

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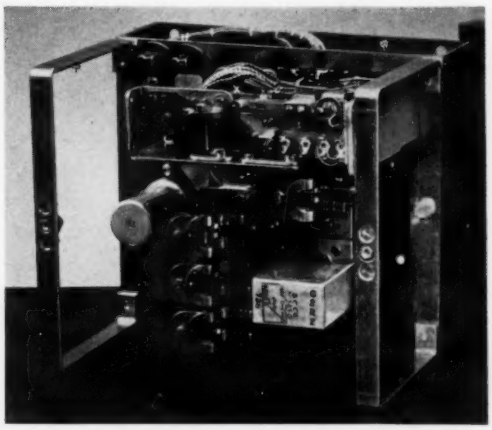

PLUS VALUE: by combining this 10-station Dial Selective Intercom Unit with the 1573-W 2-line telephone, you can provide commercial customers with a unique miniature PBX system tailored for economy and flexibility.

GENERAL DYNAMICS | ELECTRONICS

FLASHES AND PLUGS

JUST MONKEYING AROUND. Chomping the telephone is one of the least of the mischievous deeds perpetrated by the bad little monkey pictured. Blanche Harrington, secretary-treasurer of the Livingston (Cal.) Telephone Co., informed us of a regular hurricane unleashed by the simian all while he was confined to his cage.

The telephone company got in on Mr. Monk's misdeeds when a Livingston switchman discovered a receiver off the hook. He put the howler on, and the party hung up.

While checking again shortly after, he found that the same line had a receiver off again. Listening in, he heard sounds which made him suspect a housewrecking crew was on the other end of the line.

Not knowing what to think, he decided to go to the subscriber's home and check into the situation.

As he arrived at the house the lady who lives there was also returning home. Together, they walked into the living room and found a scene that made one of Mt. Vesuvius' eruptions look tame.

The lady's pet monkey, still confined to his cage, was sitting in the middle of the wrecked room, picking the petals off a bouquet of artificial roses, and throwing them over his shoulder.

The wicked one had also had a field day with the telephone, although he hadn't damaged it. He *had* thrown it into the corner, broken an end table and smashed the glass top of the table to pieces.

There has been no report as yet on whether or not the seven-pound terror was donated to a nearby zoo.

•

THAT WALKIE SHADOW! New York radio station WABC's time salesmen are now equipped with two-way radio transmitters to keep them in contact with the station while they are calling on accounts.

The station sales manager, Herb Mendelsoh, who feels it is a very satisfactory arrangement, says:

"Now we can keep them immediately informed as to changes in availability status, fast-breaking news, and vital telephone messages."

A New York *Herald Tribune* reporter opines, "It's getting so a guy can't sneak into a movie without having Big Brother looking over his shoulder!"

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Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

1901 — 60 years — 1961

August 26, 1961

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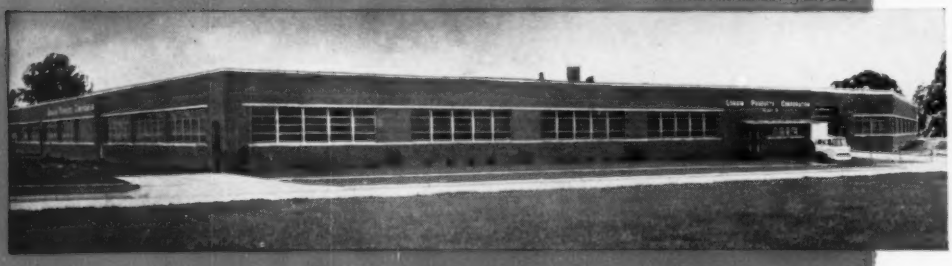

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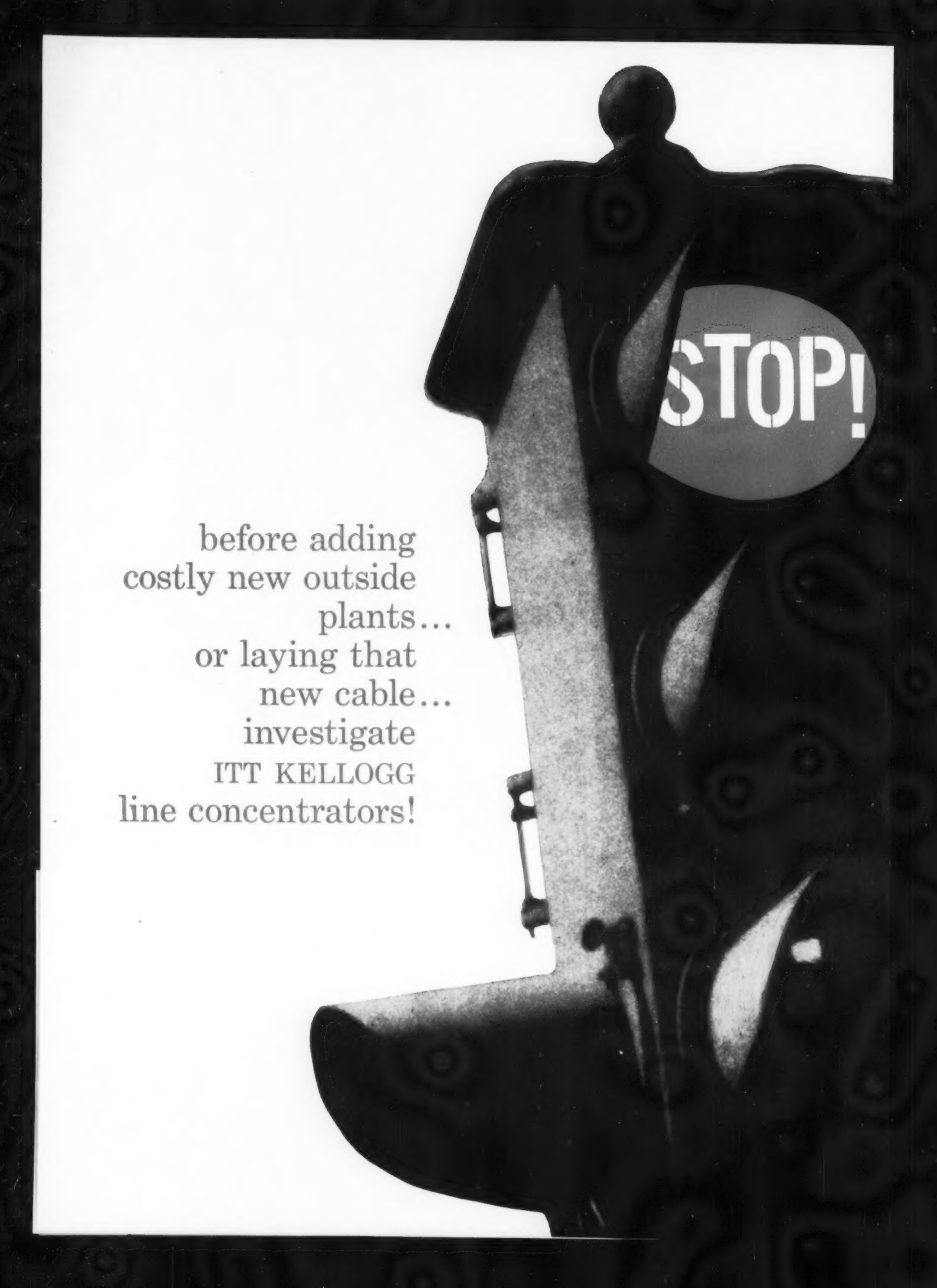

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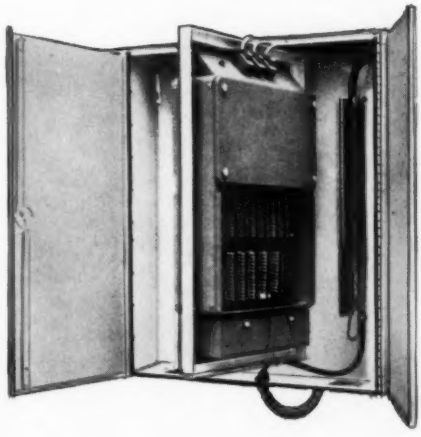

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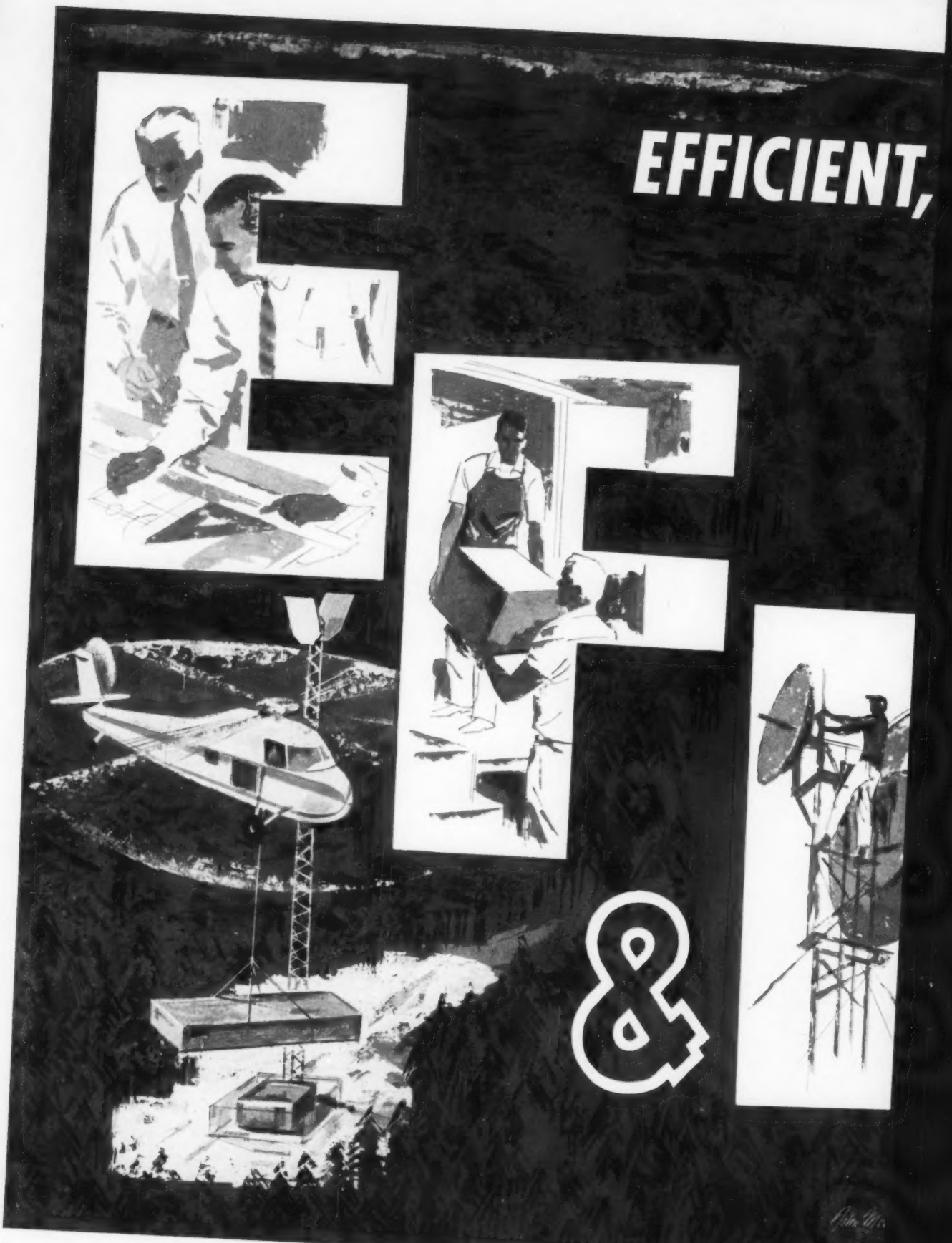
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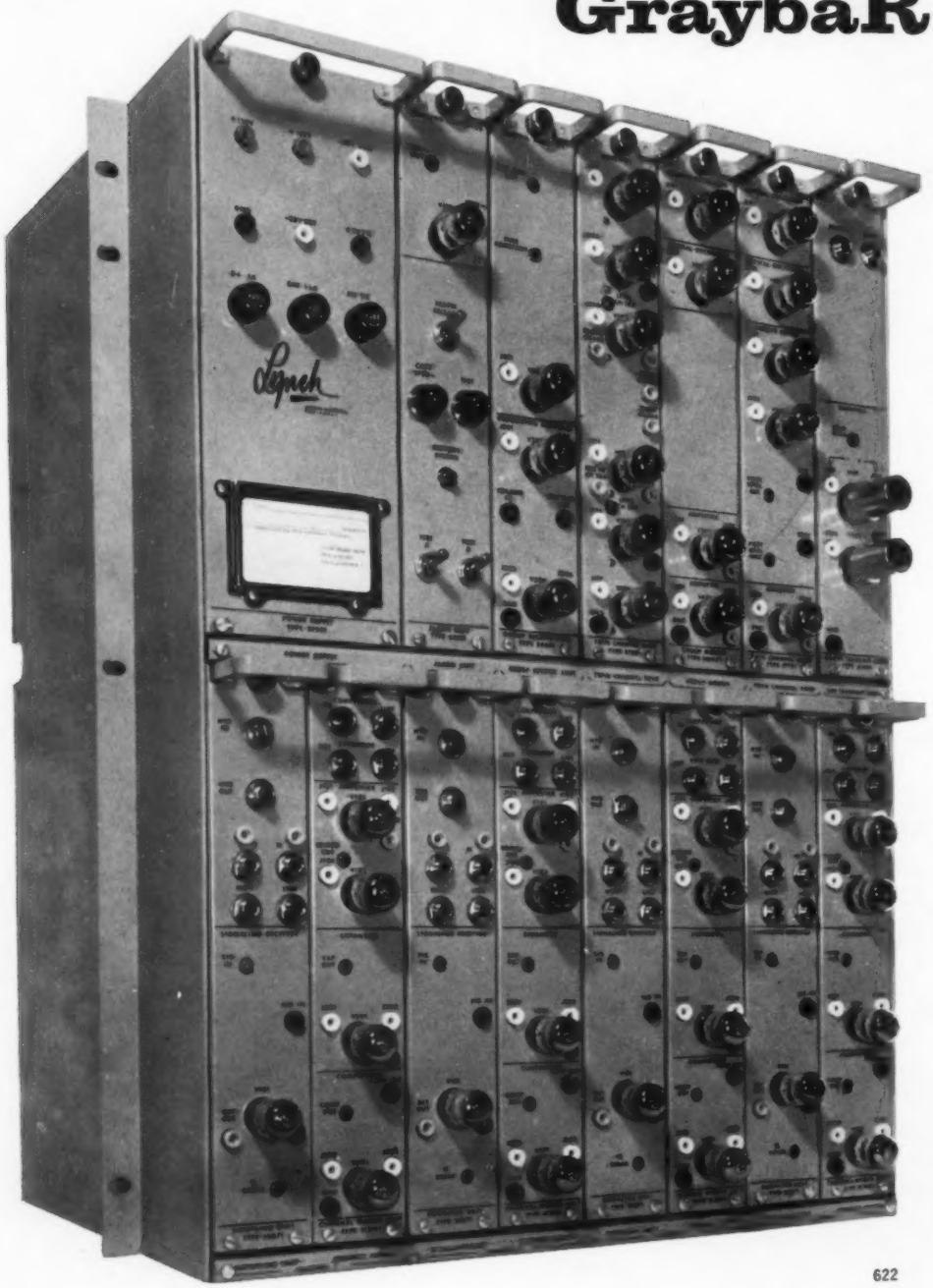

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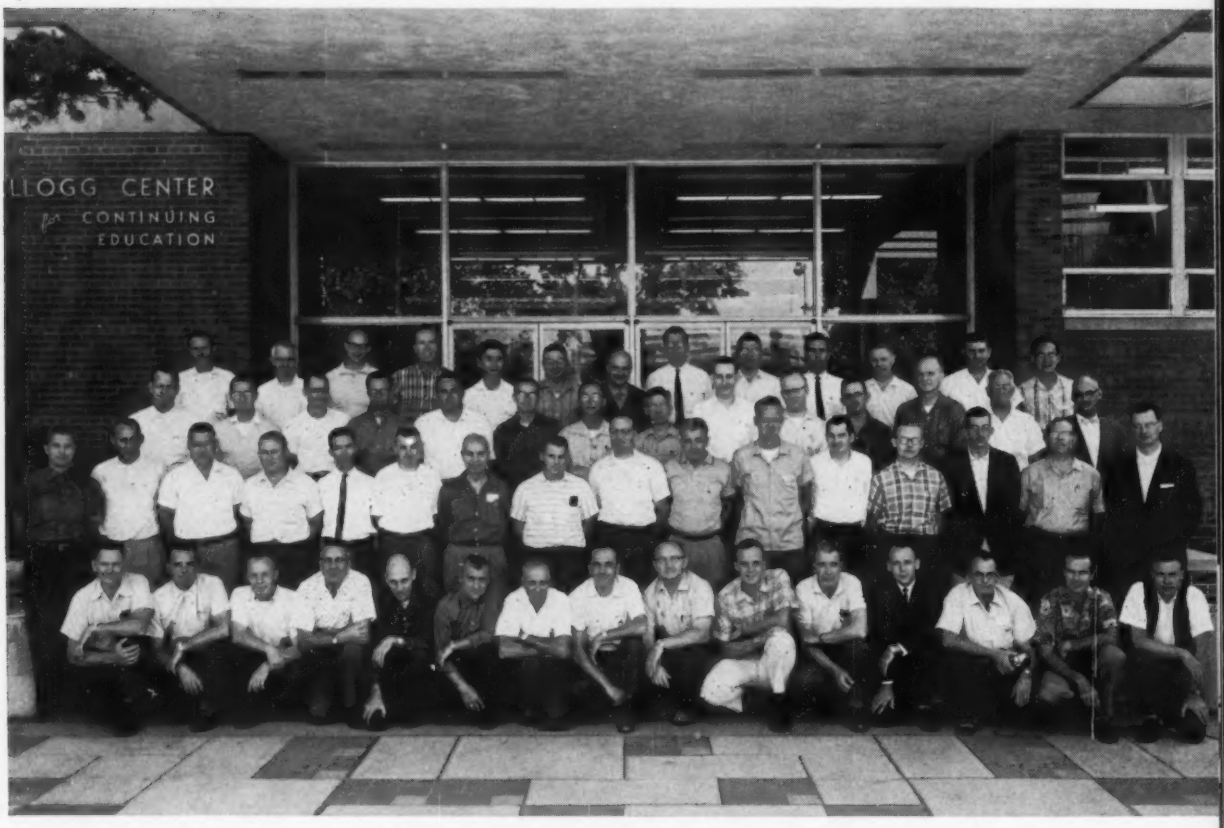
55 telephone men study engineering



Conferees at the fifth annual U.S.I.T.A. Conference come from 19 states as well as foreign countries.

Today's telephone engineer must be a knowledgeable businessman. It's his job to meet the booming demand for service through the planning of new plant facilities and the replacement of obsolete equipment. Economy must be his guidepost.

To help Independent telephone people in engineering and management, the United States Independent Telephone Association has sponsored an annual Telephone Engineering Conference at Michigan State University for the past five years. Bell Companies have also been invited to participate.

At this year's session, held June 25 to July 14, 51 Independent telephone engineers and four Bell System engineers met for intensive schooling in: (1) Fundamental Economic Concepts; (2) Cost Considerations in Engineering Decisions; (3) Engineering Fundamental Plans; (4) Communicating Engineering Decisions.

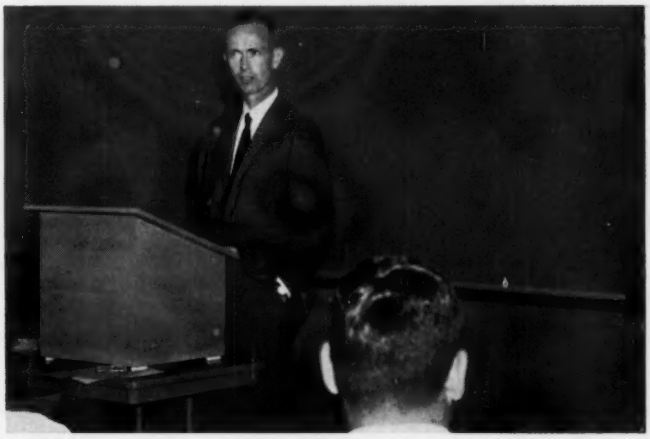
In addition to offering valuable academic training, the Conference provided an opportunity for a free exchange of ideas and experiences among all participants.

This is another example of Independent and Bell management people working together to provide even better telephone service for America at the lowest possible cost.

BELL TELEPHONE SYSTEM

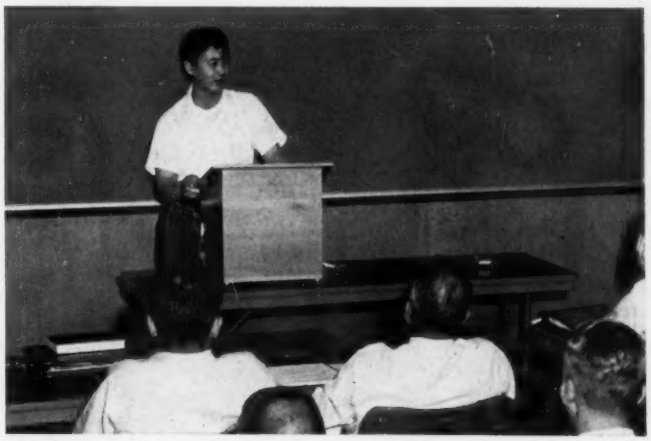
conomics at U.S.I.T.A. Conference

ring the Conference, students spend many hours solving gineering problems which will have practical applications their work. Here, J. E. Coffman (center), a Conference tructor and Exchange Planning Engineer for General lephone Service Corporation, discusses a districting dy problem with four students.



Recognized leaders in the telephone industry frequently talk to the students. Here, J. H. Felker, Assistant Chief Engineer of A. T. & T., discusses new developments in telephony. Other speakers were: R. R. Dobbin, Chief Engineer of General Dynamics-Electronics, and F. L. Kahn, Chief Telephone Engineer of Automatic Electric Company.

adquarters for the annual Telephone Engineering Conence is modern Kellogg Center for Continuing Education. uated on the MSU Campus, Kellogg Center is a comtable hotel with full facilities for conferences.



Knowing how to communicate ideas effectively is stressed in the course. Students learn oral and written business communications skills from Conference instructor Hideya Kumata, Associate Professor at Michigan State University.

JUST FOR THE RECORD..... **WARREN WAS FIRST WITH A COMPLETE LINE OF TRANSISTOR RINGING GENERATORS* FOR THE TELEPHONE INDUSTRY**

NO. 8 OF A SERIES

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This is what a Warren Transistor Ringing Generator really looks like.

FIRST IN TRANSISTOR PRODUCTS FOR THE TELEPHONE INDUSTRY

IN THE NATION'S CAPITAL

BY LAWRENCE J. HOGAN, WASHINGTON EDITOR

Fletcher named Chairman of ABA Public Utility Law Section. Appointment of new FTC chairman indicates rougher times ahead for business community. Women organize to battle against excise tax on handbags and toiletries. NASA announces plans for third communications satellite.

AT THE RECENT convention of the American Bar Association (ABA) in St. Louis, Stephen H. Fletcher, American Telephone & Telegraph Co. attorney, was named chairman of the ABA Section of Public Utility Law.

The convening attorneys heard some warnings for business. James M. Landis, President Kennedy's adviser who quarterbacked the administration's proposals for reorganization of administrative agencies, told the section that the fact that utilities in this country are operated under a regulated private enterprise system, instead of the socialized system common in most foreign countries, places a responsibility on the industry's legal profession to make the system work. He suggested that there has possibly been too much emphasis on "fairness" and "due process" at the expense of practical, effective and expeditious regulation.

The slow workings of litigation, particularly administrative, are a pet fetish of Dean Landis so his comments come as no surprise, but few lawyers would subscribe to a diluting of "due process" to streamline litigation. But all would agree that some inefficiencies could well be pruned.

The ABA's Anti-Trust Section was told by U. S. Supreme Court Justice Tom Clark that the business community would have to "clean up its house of hard-core anti-trust violations" or more businessmen might find themselves in jail. He warned that restrictive legislation and other tough measures are "not beyond the realm of possibility."

He suggested that lawyers work out a program of "preventive law" to eliminate anti-trust violations.

FTC Gears for Action

When President Kennedy tabbed Paul Rand Dixon as chairman of the Federal Trade Commission (FTC), those "in the know" saw this as a tip-off that the new administration was rolling up its sleeves to take on the business community. Dixon, who knows his way around, is an anti-truster with a missionary's zeal, as was evidenced during his career as chief counsel of the Kefauver Committee. One of his first aims was to trim the fat off FTC to give it more muscle for wrestling with business. He felt that FTC's procedures were so complex that it had trouble keeping up with those it was to regulate.

After taking office, Dixon scurried about the countryside making ominous noises about things stewing in the FTC cauldron. Your Washington editor was present at one of these speeches before a gathering of top trade and professional association executives sponsored by the U. S. Chamber of Commerce. The group obviously was very interested in what Mr. Dixon had to say. He shared the platform with several other prominent persons participating in the all-day meeting, the format of which provided for a question-and-answer session following each speaker's remarks.

Much to the disappointment of those in attendance, the "pressure of official duties" back at Mr. Dixon's desk precluded him from staying for the question-and-answer session. After reading verbatim from a prepared text which raised more questions than it answered, but included most of the familiar platitudes, Mr. Dixon hurried back to the "pressure of his official duties."

Many of the questions in our minds that day have since been answered, or at least some of the answers are now arising from that steaming FTC cauldron.

FTC operating procedures have been revised, emphasizing individual responsibility for bringing cases to a rapid conclusion. Dixon's predecessor's appointees have been removed from key staff positions throughout the agency and his own staff people of similar persuasion are now arm-to-arm in the new phalanx. The staff is being expanded from 823 to about 1,050 and this fiscal year's budget totals $10,345,000 compared with $8,009,500 last year.

Earl Kintner, whom Dixon succeeded as chairman, also wanted to make FTC more efficient, but refused to sacrifice any of the existing rights of due process to do so. Dixon, on the other hand, feels that the statutes now on the books give businessmen too much protection.

(One would think that he had compared notes with James Landis. See above). Among other things, he wants the power to issue "cease and desist" orders. He told a Senate Appropriations Committee, "I will say to you, if a temporary injunction were issued and it were sustained, even if they appealed it to the circuit court, I don't think they would drag their feet very long in waiting to litigate the matter."

With the reorganization completed and three Kennedy appointees sitting on the Federal Trade Commission, and with such strong allies over in the Department of Justice as Lee Loevinger, head of the Anti-Trust Division, the business community will get many of its questions answered in the wintry months ahead.

The Hand that Rocks the Handbag

If you think that the telephone companies have been getting a hard time from Congress about the 10 per cent excise tax (and vice versa), you ought to consider the distaff side of the argument. Ever heard of the National Committee for the Repeal of Excise Taxes on Handbags and Toiletries?

With a title like that you'd probably remember if you had heard of it.

Anyhow, the ladies are mad as hornets. Ladies who are mad as hornets have been known to sting many a congressman where it hurts most—in his political ego. Perusing the recent release of the NCRETHT (Looks kind of Russian when you put it that way, doesn't it) it appears that every member of Congress is going to have to think up a good excuse for insulting just about every woman between the ages of 14 and 85 (they *never* get older than that for the record).

What bugs the fair sex, according to NCRETHT, is that they feel they are being most grievously discriminated against simply because they don't have pockets in their skirts as the men have in their pants. Of course, some of them wear jeans and slacks on limited occasions, but even then they have to carry that handbag. And that handbag has to carry a 10 per cent excise tax, just like telephone bills. The NCRETHT demands that every member of Congress give one reason ("just one good reason") why the ladies should be taxed for their handbags as long as the men are not taxed "per pocket" in their pants.

Furthermore, the ladies say that bags are not a luxury these days any more than cosmetics. Of course, anybody but a foolish man would know better than to say that they were luxuries. But the NCRETHT is not going to let the congressmen off the hook. They are marshaling all the wives, mothers, daughters, sweethearts, old maids and girl moppets into a grand army of protest.

Telephone people will no doubt sympathize with the plight of the ladies. At the same time, this might be a good army to join. Maybe that would be a good way to get Congress to do something about the telephone excises.

Is there a single lady or girl in the entire United States who believes that a *telephone call* is a luxury and should be taxed as such? (The answer certainly would be "NO.") Maybe the telephone tax committee has been overlooking a good and powerful ally here in their battle against the excises.

Behind the vociferous protests of the outraged ladies, we think we see the fine hand of a shrewd public relations man who recognizes the importance of projecting a message in a way in which it will be heard and heeded.

Big Hit by a Little Miss

Another excellent example of the same intelligent approach to lobbying occurred on Capitol Hill Aug. 17 when a 10-year-old young lady named Francel Trotter of Washington, D. C., testified before a Senate Appropriations Subcommittee to plead for funds for a public library branch in her neighborhood.

Congress, which functions as the "City Council" for the District of Columbia, must approve all municipal expenditures for Washington. Having no representatives in Congress, the residents of the Capital City seldom find attentive ears among the impatient federal solons who prefer to spend their time and energy furthering the interests of the generous people whose mandate sent them to Washington.

Nevertheless, little Miss Trotter brought out the best in the senators, who sat upright in their chairs attentive as a suitor on a first date while she read a letter urging them to appropriate $422,000 for the library after the House allotted only $35,000 in planning money. The letter written by Francel and addressed to Sub-committee Chairman Robert C. Byrd (D., W. Va.) was signed by more than 200 junior citizens of like mind and she explained that these signatures represented "only a few of the many . . . who love to read but have no suitable facilities in our area." She pointed out that the nearest library to their neighborhood with a decent reading room was six miles away. The letter continued, "Many of us do not have the carfare to get to these branches as often as we would like, so we have to use the bookmobile, but even the bookmobile is inadequate.

"If we read more," the letter said strumming a responsive chord, "we might become teachers, doctors, chemists or other useful men and women. Please help us today."

Members of the United States Independent Telephone Association's Personnel Committee and of the faculty of the University of Kansas are shown sharing the platform at the graduation exercises of USITA's Management Development Program. (For story, see TELEPHONY, Aug. 19.) James R. Surface (left) dean of the U. of K. school of business and director of the program, in his remarks, praised the telephone men saying that they had worked "diligently and effectively." He pointed out that counting the current honorees, 131 telephone executives have completed this four-week course, including participants from Hawaii, Central and South America, as well as all corners of the continental United States. Seated, left to right, are: Dean Surface; R. J. Fegan of Junction City, Kan., chairman of the USITA Personnel Committee; Kenneth L. Dally of Lincoln, Neb., committee member and featured speaker at the graduation, and Roger L. Singleton of the University of Kansas, assistant director of the program.

When she concluded, the audience gave Miss Trotter an enthusiastic round of applause—strictly forbidden by senate rules—and Chairman Byrd, who is not always hospitable to witnesses, was obviously impressed. "I would like to say that you have made the finest appearance before our committee today," he complimented gallantly.

An enterprising telephone industry public relations man might want to find out Miss Trotter's views on telephone excise taxes.

Third Satellite Planned

The National Aeronautics and Space Administration has announced plans for a new experimental communications satellite.

Hughes Aircraft Corp. of Culver City, Cal., has been chosen to build the first relatively "stationary" communication satellite.

The 50-pound satellite will be launched into an orbit 22,300 miles above the earth. Rotating at the same speed and in the same direction as the earth, it will appear to hover.

The cost of "at least three flight units" was estimated at about 4 million dollars. The first launching is scheduled for late 1962.

NASA gave the proposed satellite the name of Project Syncom, describing a communication satellite in synchronous rotation with the earth.

NASA said the orbiting Syncom satellite would move in an elliptical pattern 33 degrees north and south of the equator, over a given longitude near the east coast of the United States.

Thus, unlike the truly "stationary" satellite — the military Advent spacecraft now under development—the Syncom craft will waver considerably to the north and south.

The Syncom satellites will be designed to relay telephone conversations and telegraph messages over near hemispheric distances.

The early units will not carry television band widths.

The project is the third NASA program for active communication satellites. It has its own Project Relay being developed by Radio Corp. of America and the privately financed American Telephone & Telegraph Co. satellite.

These two types of satellites will test communication relays at relatively low altitudes, up to 3,000 miles.

At a hearing before the Senate Small Business Sub-committee, last week, Chairman Long (D., La.) accused the FCC of seeking to hand over the United States' share of the proposed global communication satellite system to a monopoly dominated by American Telephone & Telegraph Co.

The FCC has denied the charge. FCC Chairman Minow said no commitments have been made to any of the 10 international telephone and telegraph companies which are now preparing plans for private operation and ownership of space satellite communications. Long expressed doubt that the FCC could regulate the union of companies in which AT&T, with a near monopoly of overseas telephone service, would be dominant.

The Small Business Administration has also expressed concern to Congress over possible discrimination against small companies if the space communications system is turned over to the combine of the 10 companies.

James E. Webb, NASA administrator, has said that firms chosen to build the first satellites will be required to share the benefits of their development work and that precautions have been taken to prevent the pioneering firms from gaining undue advantage over others not taking part in the initial projects.

On Aug. 17 the House Judiciary Committee approved a Senate-passed bill that would broaden the federal statute prohibiting destruction of communications facilities. The legislation, which would impose maximum penalties of a $10,000 fine and 10 years in prison or both, gained impetus from the dynamiting of three AT&T microwave relay stations in the West earlier this year. (See "In the Nation's Capital," July 8 issue.)

On Aug. 16, the Senate and House conferees agreed on a compromise version of the bill to reorganize FCC which would allow the commission to delegate certain duties to individual commissioners and staff employes. (See "In the Nation's Capital," Aug. 12 and 19 issues).

Hanford Plant Rejected by House

The House of Representatives again rejected the controversial 95 million dollar electric generating plant at Hanford, Wash. (See "In the Nation's Capital," Aug. 19 issue). The measure brought about a heated contest in legislative pressure between conservative groups (the Chamber of Commerce of the United States, electric utilities, *et al.*) and the administration forces. Worry over increased defense spending and the prospects of a new "TVA" were apparently enough to give Republicans and conservative Democrats the power to pull a 235 to 164 vote.

The Senate had earlier voted for the plant by a wide margin.

The in-fighting got pretty bitter with Rep. Chet Holifield (D., Cal.) and Sen. Clinton P. Anderson (D., N. M.), members of the Joint Atomic Energy Committee, leading the proponent forces. The electric utilities were threatened with revocation of accelerated tax depreciation and cessation of joint participation with the Atomic Energy Commission in nuclear plant developments.

Convention Calendar

1961

Association	*Date*	*City*	*Hotel*
Tennessee	Sept. 6 and 7	Nashville	Hermitage
Arkansas	Sept. 11 and 12	Hot Springs	Arlington
Rocky Mountain	Sept. 13, 14 and 15	Boise, Ida.	Owyhee
Georgia	Sept. 14 and 15	Jekyll Island	Corsair Motel
Michigan	Sept. 19, 20 and 21	Grand Rapids	Pantlind
Nevada	Sept. 19, 20 and 21	Elko	Stockmen's
New England	Sept. 24, 25, 26 and 27	Poland Springs, Me.	Poland Springs
West Virginia	Sept. 26 and 27	Wheeling	Olgebay Park
USITA	Oct. 8, 9, 10 and 11	Chicago	Conrad Hilton
South Carolina	Oct. 23 and 24	Clemson	Clemson House
Virginia	Oct. 26 and 27	Roanoke	Roanoke
Oklahoma	Nov. 8 and 9	Oklahoma City	Skirvin
Alabama-Mississippi*	Nov. 13 and 14	Birmingham	Thomas Jefferson
Florida	Nov. 26, 27 and 28	Miami Beach	The Carillon
North Carolina	Dec. 4 and 5	Pinehurst	Carolina

*Joint meeting

ABC of the Telephone

by Frank E. Lee

HERE IS IMPORTANT news for the telephone fleet manager — diesel economy may be added to the future telephone fleet. This is big news because diesel economy adds up to substantial savings in over-all fleet operating costs.

In many cases, savings of 25 per cent in over-all operating costs are not unusual when a diesel equipped fleet is compared with a gasoline engine equipped fleet. This is the big reason why telephone fleet managers should study the possibility of adopting medium duty trucks with assembly installed diesel engines similar to the units recently introduced in the United States by the Studebaker-Packard Corp. Indications are that other manufacturers will soon come out with diesel equipped medium duty trucks. One of the new medium duty trucks with an assembly installed unconverted diesel engine is shown in *Fig. 1.*

These new diesel trucks are rated at 19,500 and 23,000 pounds gross vehicle weight, and 35,000 and 41,000 pounds gross combination weight. Wheel bases range from 131 to 195 inches.

The power plants used in the new Studebaker trucks are Series 53 four-cylinder, two-cycle engines, manufactured by General Motors Detroit Diesel Division. The Series 53 diesels, introduced in 1958, have been performance proved in hundreds of typical medium duty trucks similar to that shown in *Fig. 2.* These applications resulted from conversions from gasoline to diesel power. Included were over-the-highway and pickup and delivery operations similar to the service required of many telephone fleet vehicles. The difference between the trucks currently in service and the new trucks being placed on the market is the diesel engines on the new trucks are installed on the factory assembly line. This has cost and design advantages when compared to trucks converted from gasoline engine operation to diesel engine operation.

PART 100. THE TELEPHONE FLEET. Section 3. Diesel Economy May be Added to the Telephone Fleet.

Section 2. Good Management Pays Off in Better Fleet Service (TELEPHONY, Apr. 29).

Section 1. A Vital Link in a Good Communications System (TELEPHONY, Apr. 22).

Series 53 Diesel Engine

The Series 53 diesel engine produces 130 horsepower at 2,800 rpm, an engine speed normally reached in truck operations. This engine delivers over 270 foot-pounds of torque at a speed of 1,500 rpm. The term torque originates from the Latin word "torquere," meaning to twist. Thus, the torque of an engine in foot-pounds is a way of expressing the power of an engine in foot-pounds of turning or twisting effort applied to the drive shaft.

Fig. 1

Fig. 2

The higher torque output of the diesel—at lower engine speeds—is a significant advantage over the gasoline engine. This fundamental design characteristic of the diesel engine provides greater power for more work-producing ability. In automotive terms, this is known as performance.

Performance means ability to do more work in less time, and to provide more power to do the job. Diesel engine manufacturers claim that diesels have proven their ability to outperform gasoline engines in almost every power application. The diesel will consistently accomplish more productive work—especially when the going gets

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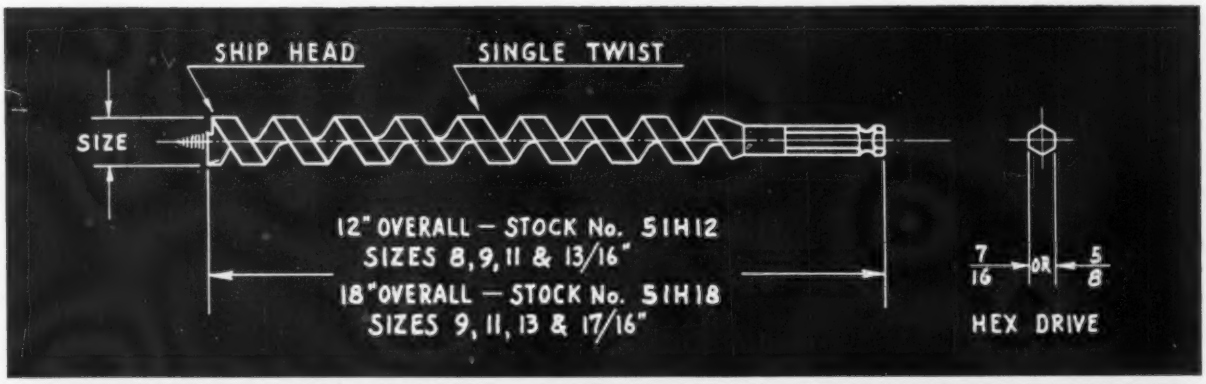

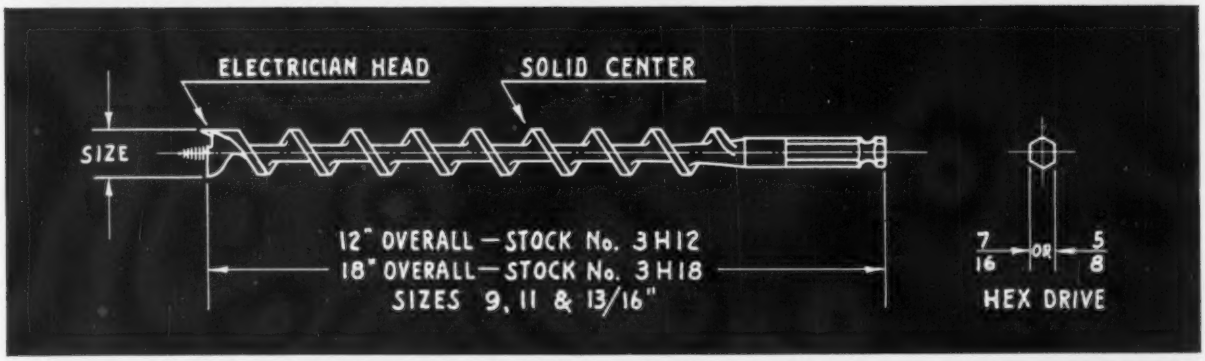

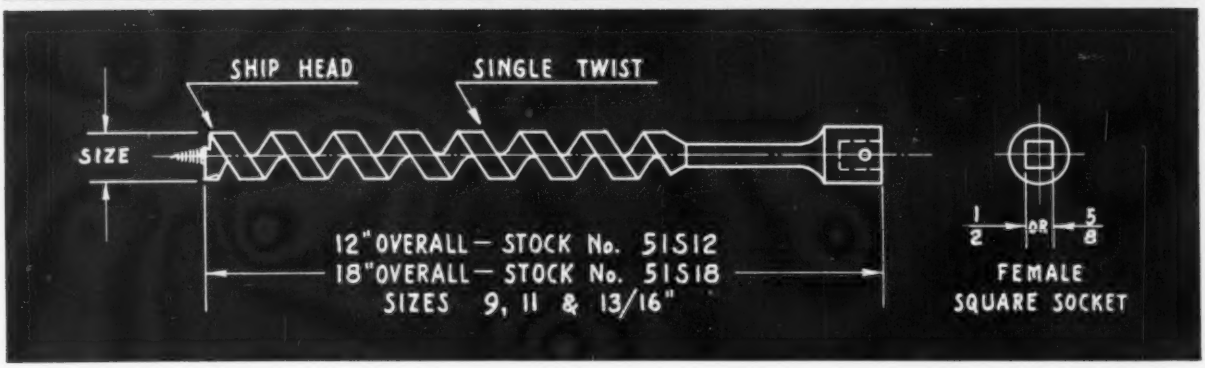

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tough—when a gasoline engine and a diesel work side-by-side in identical equipment. Primarily, this occurs because the gasoline engine reaches peak horsepower output at higher rotative speeds, measured in revolutions per minute, than the diesel. The diesel operates at lower speeds and develops higher torque output.

The combustion process is the fundamental difference between the gasoline engine and the diesel engine. In the gasoline engine, a carburetor furnishes a mixture of gasoline and air that is drawn into the combustion chamber of each cylinder. The fuel-air mixture is compressed and ignited by an electric spark furnished by the ignition system.

Four-Cycle Engine

All automobile engines made in this country, at the present time, are four-cycle engines, more correctly called "four-stroke-cycle" engines. Thus, four strokes of the piston in any one cylinder are required to complete the "cycle" of taking into the cylinder the air-fuel mixture, compressing the charge, firing the charge (power stroke) and finally exhausting the burnt charge or gases. The four strokes require two complete revolutions of the crankshaft and are designated as inlet, compression, power, and exhaust strokes.

The four-cycle gasoline engine operation, illustrated in *Fig. 3*, is as follows:

Inlet Stroke—The intake valve is open and the exhaust valve is closed. The piston is moving downward and the fuel-air mixture—delivered to the intake manifold by the carburetor—is drawn into the cylinder.

Compression Stroke—The intake valve closes at the bottom of the intake stroke. The piston moves upward and compresses the air-gas mixture. The compression ratio is on the order of 9 to 1 or 10 to 1.

Power Stroke—The ignition system delivers a spark between the spark plug electrodes a few degrees before the piston reaches top dead center. This

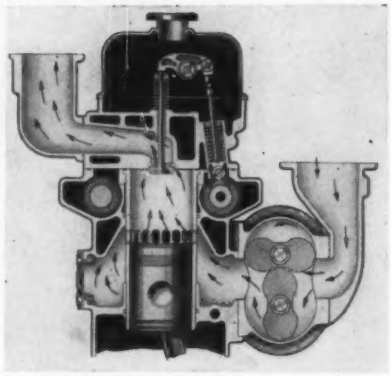

Fig. 4

ignites the air-gas mixture to deliver a downward thrust at the moment when the piston starts moving downward in the power stroke. The rapid expansion of the combustion forces the piston downward.

Exhaust Stroke—The exhaust valve opens at the bottom of the power stroke. The burned gases are exhausted as the piston moves upward. The exhaust valve closes and the intake valve opens at the top of the exhaust stroke. The four cycle process is repeated from this point.

Two-Cycle Diesel Engine

The two-cycle diesel engine provides a power stroke on each piston downstroke. Only air is drawn into the combustion chamber. The air is compressed by the cylinder in a ratio on the order of 17 to 1 or 18 to 1. This high compression causes a rapid increase in the temperature of the air. At the moment of highest heat, a quantity of fuel is accurately injected into the cylinder. The superheated air causes immediate and complete combustion of the fuel, thus freeing the energy that gives the engine a powerful turning force. In this way the diesel fuel injection system replaces both the carburetor and ignition system used in the gasoline engine. The two-cycle diesel engine operates as follows:

Downstroke—During the upstroke the exhaust valves are closed and air trapped in the cylinder is compressed to the point of highest heat. At this instant at almost top dead center of piston travel, a measured amount of fuel is injected into the cylinder. Immediate combustion occurs. The piston is forced downward. At a point near the bottom end of the stroke the piston moves past a series of air inlet ports in the cylinder liner. The inlet ports open into an air passage in which air is under continual pressure of an impeller blower. As the air inlet ports are opened the exhaust valves start to open. The air under pressure rushes into the inlets and forces the residue of the combustion through the exhaust valves. This is termed "blower scavenge" and eliminates the need of an exhaust stroke of the piston to force the burned gases from the combustion chamber.

Upstroke—The displacement of the combustion residue with clean air takes place within the few moments required for the piston to complete the downstroke and move upward to close the air inlet ports. The exhaust valves close as the inlets are covered. The piston continues to move upward and the air trapped in the cylinder is compressed to the point of highest heat and the process repeats as described in the downstroke cycle. The movement of air in the Series 53 diesel engine is shown in *Fig. 4*.

The basic difference—from the intake and exhaust standpoint—is that a four-cycle gasoline engine has a separate intake and exhaust stroke. These strokes are eliminated in the two-cycle diesel by injecting the fuel at the top of the compression stroke and blower scavenge removal of the burned gases at the lower end of the power stroke.

A diagram of the fuel injection system of the Series 53 diesel engine is illustrated in *Fig. 5*. The system consists of one unit injector for each cylinder and a low-pressure fuel transfer pump. The fuel passes from the tank on the lower right along the lower feed line, through filters and the transfer pump, to the four unit injectors at the top of the diagram. Unused fuel returns to the tank through the upper line. In essence, the injectors draw their fuel from the continuous supply flowing in the fuel supply line. Each injector times, measures, pressurizes, and atomizes the fuel.

A cross-section diagram of the Series 53 engine is shown in *Fig. 6*.

The higher compression ratio of the diesel engine, plus accurate injection of fuel into each cylinder, gives the diesel engine a higher thermal efficiency than a gasoline engine. Automotive engineers estimate that the thermal efficiency of the diesel engine is as much as 35 per cent greater than a gasoline engine. Thus, the diesel engine is a great deal more effective as a machine for converting fuel energy into mechanical energy.

Another factor of importance to diesel engine power output is the

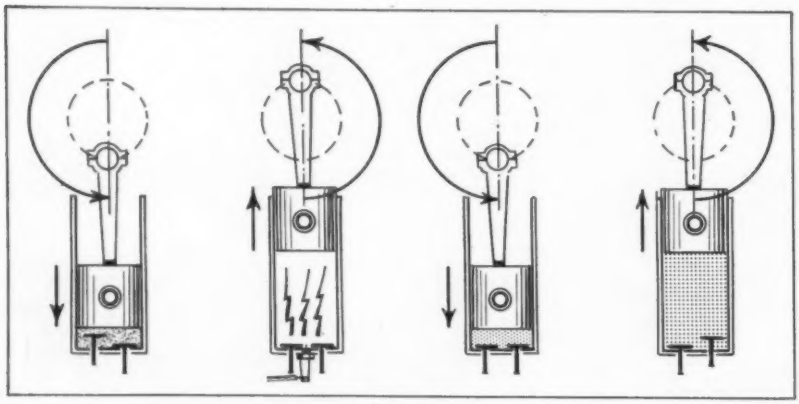

Fig. 3

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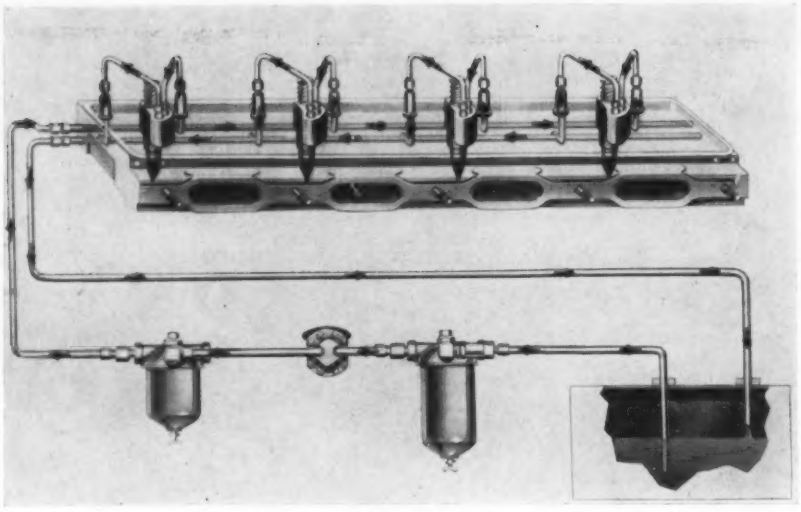


Fig. 5

higher energy content of diesel fuel as compared with gasoline. The work capability of an internal combustion engine is largely dependent on the heat value, measured in British Thermal Units (BTU's) available in the fuel. On this basis, the greater the heat value of the fuel the more work the engine can accomplish.

Tests have shown that diesel fuel has about 10 per cent more energy content than gasoline. The combination of the higher energy content of diesel fuel and the higher thermal efficiency of the diesel engine results in producing more power than a comparable gasoline engine.

Diesel Efficient Other Ways

The diesel engine, used in the new medium duty trucks, approaches the most outstanding fuel economy in typical city operating situations involving stop and go driving. This economy is possible because of the precise fuel injection system which controls fuel consumption in far closer proportion to power output than with gasoline engines. At idle speeds, part throttle, or full throttle, the fuel injected into each cylinder of a diesel engine is accurately metered and under control for greatest thermal efficiency.

Experience has shown that diesel engines operate from two to five times as long between overhauls as the heaviest duty gasoline engines. Perhaps the basic reason for this longer life is the ruggedness of the diesel engine design. A diesel engine has to be built stronger mechanically and metallurgically to withstand the higher internal pressures of diesel construction. To do this all parts in the engine have to be stronger and more rigid.

Another reason why diesels operate longer is that diesel engines operate at lower revolutions per minute than most gasoline engines. This means lower piston speeds and a consequent reduction in wear. Calculations of piston travel per year show that as much as 25,000 miles of piston travel per year, per piston, is saved in the diesel engine. Engine wear is reduced in almost

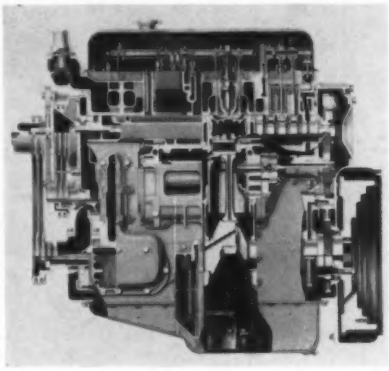


Fig. 6

a direct proportion to the reduction in piston travel.

Engineers state that the diesel engine eliminates washing off of lubricating oils from pistons and cylinder walls as caused by the rich mixture usually required during the initial warm-up period after starting the gasoline engine. The high relative ignition temperature of the diesel engine means greater combustion efficiency even when the engine is cold.

An added benefit of the diesel truck engine is more efficient engine braking. This is an important safety factor and is also an added economy because of the reduction in brake lining wear. Gasoline is continually pumped into the engine and ignited when the gasoline engine is used as a brake. However, with many diesel engines—and particularly with the engines used in the new medium duty trucks—fuel flow is cut off completely when the engine is used as a brake. This provides the fullest possible engine braking effort without wasting fuel.

Clean Fuel Important

Perhaps the only secret about successful diesel operation is to use clean fuel with proper lubricating qualities, and to keep the fuel system free from dirt, water, and air. The emphasis on clean fuel and a clean fuel supply system is necessary because a diesel fires on compression without spark ignition. Thus, the only factor that may vary in day-to-day operation is the quality and quantity of fuel injected into each cylinder during a cycle of operation. A restricted fuel line or the use of contaminated fuel will impair the efficiency of the fuel injection system or reduce the combustion efficiency in the cylinders. The end result—loss of performance and power—will be about the same in either instance.

What About Diesel Smoke?

Generally, a properly adjusted diesel engine will not smoke. A possible cause of diesel smoke is an overloaded engine, caused by the injector fuel setting having been altered. Overloading, in this respect, is the result of injecting more fuel than the amount of air in the cylinder will support in combustion. This condition is not unique with a diesel engine. Practically any thermal combustion device will smoke if an excessive amount of fuel is fed into the combustion chamber. In the diesel engine, the surplus fuel in the cylinder will not burn properly and will be discharged into atmosphere as smoke.

Thus, the answer to the diesel smoke problem is proper maintenance. With good upkeep and operation the diesel engine combustion will be complete and clean.

The diesel equipped truck, shown in

(Continued on page 56)

Fig. 7

Small Companies Can Benefit

From Liberalized Depreciation Under "Normalization" Treatment

By WILLARD F. STANLEY*

ABOUT SEVEN years have now elapsed since liberalized depreciation for income tax purposes was adopted as part of the Revenue Act of 1954. Despite this passage of time, we find that as many as 18 state regulatory commissions located in the Continental United States have still failed to adopt a policy as to the treatment of the reduction in taxes arising from liberalized depreciation through the permitted deduction for tax purposes of larger amounts of depreciation in the earlier years of the life of the property involved.

An authoritative source shows that 30 state commissions in the Continental United States, plus the Federal Power Commission (FPC), have now reached a decision as to the treatment of this item for accounting and rate-making purposes. The FPC is not pertinent to this discussion since it has no jurisdiction over telephone companies. By a strange coincidence, the same source shows that 15 of the state commissions, which have reached decisions in this matter, have adopted some form of the so-called "normalization" treatment thereof, while the other 15 favored the so-called "flow-through" treatment.

Court Decisions in 6 States

There have been final court decisions in six states, and, again by coincidence, three such decisions favor "normalization," and three "flow-through."

Table I shows the various states in which regulatory bodies have reached decisions in the matter to date and gives the method arrived at in each case.

Under "normalization" treatment, the reduction in income taxes, due to adoption of liberalized depreciation, is offset on the income statement by an item usually designated "provision for future federal income taxes," or by some similar appellation. This item is in an amount equal to the tax reduction from liberalized depreciation, and, being charged to income, offsets the former item with the result that net income remains unchanged.

The "flow-through" theory calls for letting the reduction in income taxes "flow-through" to enhance net income, thus increasing the amount of surplus accordingly.

"Normalization" Treatment

The "normalization" treatment calls for crediting the provision for future federal taxes either (1) to a special reserve for future income tax liability, or (2) to restricted surplus which is not distributable in dividends. The majority of the commissions adopting the "normalization" approach favor method number (1). Two of the commissions provide that the provision for future taxes shall be credited to the depreciation reserve.

However, a considerable number of the commissions, which have adopted the principle of "normalization," have not adopted what might be termed "full" normalization. In six instances, the commissions require that the reserve for future tax liability be deducted from the rate base, while in four other instances, the commissions state that they will take account of the "interest-free" funds represented by the reserve for future taxes in considering the proper rate of return to be allowed on the rate base of the utility.

Five Give Full Treatment

Thus, it may be said that only five of the 15 commissions adopting "normalization" have given the utility the full benefit of this treatment, whereas the other 10 commissions either deduct the accumulated reserve in arriving at the rate base for rate-making purposes, or else take this reserve into account in considering the rate of return to be allowed. Nevertheless, while the utility does not obtain the full benefit of "normalization" in these 10 cases, it probably receives the greater part of such benefit.

Table 1 does not disclose the states permitting the provision for future taxes to be credited to restricted surplus. This is, however, of relatively minor importance to small telephone systems without public ownership of their common stock. The credit to restricted surplus serves to build up the common stock equity and thus improves the common stock equity ratio in the company's capitalization. This may make the stock more attractive to security analysts. However, where the stock is held privately, the analysts' opinions are of no importance.

Cash Income Benefit

The "normalization" treatment gives the utility using it the benefit of increased cash income to the extent of the reduction in taxes arising from liberalized depreciation, without the offsetting disadvantage of having such reduction in taxes considered, by state regulatory bodies, as additional income for rate-making purposes. The additional cash income can, therefore, either be applied toward meeting financial requirements for the expansion of the system, or be distributed to the stockholders, or other owners of the utility, in dividends or otherwise.

In the case of large utility systems, such as the larger publicly-owned telephone systems and electric and gas utilities, the primary emphasis is on

*Mr. Stanley, a former utility financial executive, is President of Corporate Services, Inc., of New York City and is well known as a financial writer.

"NORMALIZATION"		"FLOW THROUGH"	
Alabama	B ( )	Colorado	
California	B*	Connecticut	
Florida	A	District of Columbia	
Georgia	B	Maine	( )
Illinois	B	Missouri	
Indiana	C ( )	New Hampshire	
Kansas	C ( )	New Jersey	
Kentucky	B	New Mexico	
Louisiana	A	New York	
Michigan	C	North Carolina	
Nevada	A	North Dakota	( )
Oklahoma	A	Ohio	
Oregon	C	Pennsylvania	( )
Wisconsin	#	South Carolina	
Wyoming	A	West Virginia	

NOTE: In addition, the Federal Power Commission provides for full "normalization."

() Final court test upholding commission.

A. Full normalization.

B. Accumulated reserve for future taxes is applied to reduce rate base.

C. Effect of "interest-free" funds on cost of capital considered in fixing rate of return.

* The California decision was by a 3-2 division; it does not approve of normalization, but gives the effect thereof by providing for charging income an amount equal to the reduced taxes and crediting it to the depreciation reserve.

\# Instead of making a separate charge to income for provision for future taxes, a like amount is added to the depreciation charge which is then credited to the depreciation reserve.

TABLE I

increasing book income. This is because the common stocks of these companies are publicly owned and the increased income operates to enhance per share earnings on the common shares and thus tends to increase the market value of these shares. The economic gain from liberalized depreciation to such large utility units under "normalization" treatment arises, therefore, solely from the economic value of the interest-free use of the accumulated amount of reduced taxes for the weighted average period, during which such taxes are deferred. This can be an important economic benefit, but no benefit arises from the reduction in taxes in terms of book income, since the tax reduction is offset on the books by a charge to income in a like amount, representing a provision for future federal taxes. Thus, there is no increase in income, and, consequently, no enhancement of per share earnings or rise in the market value of the common stock.

Different in Small Companies

However, in the case of small telephone companies the situation is quite different. Here, in many cases, public ownership is not involved and the owners of these companies accordingly look primarily not to book earnings, which are of small benefit to them, but rather to increased cash income, which can be converted into additional "take-home" return on the investment, paid in salaries or, at their option, may be used to help finance property additions.

This being the case, it appears that small telephone companies are so situated as to derive the maximum benefit from "normalization" treatment of liberalized depreciation. This, of course, leads to the premise that such companies should, in their own interest, adopt liberalized depreciation as to all additions where the items can be sufficiently identified without undue trouble or expense. It will be observed that, although small telephone companies will have the benefit of increased cash income to the extent of the reduction in taxes from liberalized depreciation, such increased income should not materially affect their income for rate-making purposes. Income for rate-making will not be increased because of liberalized depreciation, since the reduction in taxes will be equalled, on the books, under the "normalization" treatment, by the deduction of a similar amount as a provision for future federal taxes.

Example Cited

If a small telephone company expanded by $10,000 of new additions annually, of which, let us assume, $4,000 was represented by items of a nature readily identifiable for segregation for the purpose of applying liberalized depreciation, the tax reduction at an assumed 30 per cent tax rate, would be only about $36 for the first year. This assumes an increase in tax depreciation charges for the first year of life of the new additions of 3 per cent of the cost of the $4,000 of identifiable additions, or $120. But if we assume the expansion is annually recurring at the above rate, the annual increase in cash income would accumulate, until, at the end of 10 years, it would probably reach the neighborhood of $300 for the last year and $1,680 for the 10-year period.

This would make a worth-while increment to cash income for a company of this size, which might be assumed to have a net income around $10,000 a year. This assumes a net plant account of about $167,000, with a 6 per cent, or $10,000, annual rate of expansion. On the basis of $16,000 a year, net income in the 10th year, net cash income would increase about 2 per cent from this source during that year.

Even in cases where the commission, having jurisdiction over the company, required application of the reserve for future taxes to reduce the rate base, the adverse impact of this factor, following a rate proceeding involving the company, would not equal the benefit in increased accumulated cash income for a great many years, so that substantial benefits in terms of increased cash income should be received by such a company, even where there is a "string" on the "normalization" treatment.

Impact Hard to Determine

In cases where the commission policy is to consider the "interest-free" funds represented by the accumulated tax reserves in fixing the allowed rate of return in a rate case, the exact impact of this policy is harder to determine as an offset to the increased cash income arising from "normalization," but it seems unlikely that such impact would be sufficient to come anywhere near offsetting the cash income increase.

The benefits to small telephone companies from "normalization" also apply, of course, to companies operating in those states where the regulatory body has yet to reach a decision as to the treatment of liberalized depreciation. The future trend in the direction of either "normalization" or "flow-through" is difficult to determine, but it appears the consensus of informed opinion leans somewhat in favor of "flow-through" being likely to predominate as to those commissions yet to reach a decision in the matter.

With 18 commissions in the continental U. S. still to be heard from, the chances seem to favor that a ma-

(Continued on page 54)

BY PAUL E. MURPHY, ELECTRONICS EDITOR

DATAPHONE SERVICE

THAT IN THE NEXT decade telephone-company-provided facilities will be used more for various modes of data transmission than they will be for voice communications is not hard to believe. Especially does one begin to accept this as being likely when he thinks of Mechanized Teletypewriter Exchange service, and various Dataphone services being developed and installed to provide for the multitude of customer requests.

The Lima (O.) Telephone & Telegraph Co. recently installed its first Dataphone service at the Lima branch office of Auto-Owners Insurance Co. The new dataphone unit, designated the Type 200 Model 3A, is being used by the Auto-Owners company branch office to "talk" with a similar unit installed at the home office at Lansing, Mich. Several other branch offices are also equipped with the data subsets to converse in the same manner; each branch office being assigned specific hours during the day in which to communicate with the main office.

The data subset accepts and delivers data signals in binary form. The input is a series of either positive or negative voltage impulses representing binary zeros or ones called "bits." "Bits" is a contraction of the two words binary digits. The bit rate or speed of the incoming information may vary from approximately 75 to 1,200 bits per second using the Model 3A. Factors governing the bit rate are the line facilities connecting the two subsets and the type of customer equipment "feeding" the information to the subset.

Frequency shifting of the carrier is the basic transmission pattern and uses a considerable portion of the voice band. When a "mark" or binary one is impressed at the input of the data subset, one of two frequencies designated F1 is transmitted. Frequency F1 is 1,400 cycles per second where equalization is specified. The "mark" signal is represented by a negative dc voltage impulse presented by the customer's equipment to the data subset.

Frequency F2 is the result of customer equipment presenting a "space" or binary zero to the data subset. Frequency F2 may be either 1,900 cycles per second or 2,000 cycles per second, the higher frequency representing F2 where equalization is used.

The "space" signal is the result of customer equipment presenting a positive dc voltage impulse to the data subset. Both "mark" and "space" voltage amplitudes must be between 3 and 25 volts, either negative or positive as discussed above.

The installation at Auto-Owners also contains a type 544BBR-51 telephone set. A normal telephone connection is made to establish communication between the sending and receiving terminals of the line. After first establishing a normal telephone connection, selection of the data mode is made by depressing the proper push-button key located on the telephone set thereby permitting the customer's equipment to "talk." Having transmitted the desired data, the talk mode is re-established by depressing a second push-button key.

Fig. 1 is a block diagram of the

Modulator, demodulator, control circuit, and attenuation equalizer circuitry of Dataphone Type 200 Model 3A mounted on printed-wire boards which plug into the main shelf assembly. Removed from shelf is the control circuit board.

Type 200 Model 3A data subset. Major components include the modulator, demodulator, power supply, and control circuits. The functions of the first three circuits are readily understood. The latter circuit, namely, the control circuit, performs functions of particular interest.

The control circuit allows the data subset to be operated from any customer-provided equipment which conforms to the standards of Electronic Industries Association (EIA). The circuitry consists of an interlock circuit, a request-to-send and start-to-send circuit, a carrier detector circuit, the clamp on demodulator output, and a control relay.

An interlock signal provides the customer with an indication of the operating condition of the digital subset; whether or not it is capable of sending.

A control relay is used to connect the telephone instrument to the line and disconnect the data subset.

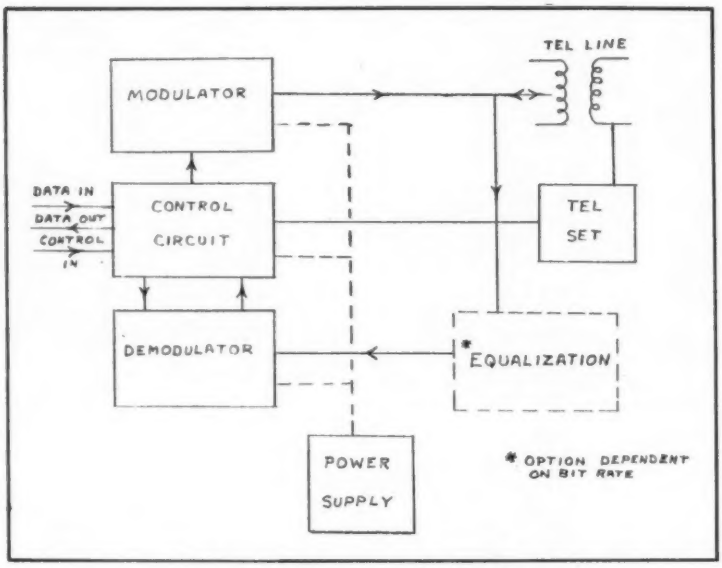


Fig. 1. Block diagram of digital subset.

The request-to-send signal is a positive dc signal from the customer equipment which informs the digital subset that information is to be transmitted. Upon receipt of this dc voltage, the digital subset is energized and carrier is transmitted. After a delay of approximately 250 milli-seconds, a positive voltage is supplied to the start-to-send lead, notifying the customer equipment that it may begin sending.

The carrier detector determines when carrier is being received from the distant terminal and gives an indication that carrier is coming into the demodulator circuitry. The carrier detector gives the received carrier indication approximately one milli-second after carrier is received.

The clamp circuit is used to hold the demodulator output in a "mark" condition until about 50 milli-seconds after carrier is initially received. The clamp on the demodulator output is not effective until approximately 15 milli-seconds have elapsed

IBM's models 066 Transceiver and 068 Signal Unit when used in conjunction with Type 200 Model 3A Digital Data Subset permit transmission of punched-card information over regular telephone circuits at speeds up to 1,200 bits per second.

since last receiving carrier. This design prevents reclamping the demodulator output should short-duration hits occur.

The data subset installed at Auto-Owners Insurance Co. is being used to facilitate the issuance of new insurance policies and changing of existing policies.

Customer equipment consists of International Business Machines Models 066 Data Transceiver and 068 Signal Unit. Previously prepared punched cards containing the insurance data are "fed" into the IBM equipments which "read" and supply electrical impulses to the data subset. The electrical impulses are then converted to audible tones and sent over telephone facilities to the receiving terminal.

At the receiving terminal, the digital subset reconverts the tones into electrical impulses, and IBM equipment is used to reproduce the punched cards. The cards containing the insurance data are used to feed a computer for processing.

Thus, "machine talk" is sent over telephone wires much as human conversation is, but at speeds of up to 800 characters, or approximately 133 words a minute.

DEHYDRATORS FOR MICROWAVE

IN A RECENT issue of Bell Laboratories *Record* (July, 1961), J. M. Jackson of Bell Telephone Laboratories discussed the need for, and the design of, air-drying apparatus for microwave systems.

The effects of accumulation of moisture in waveguides and antenna components are well recognized throughout the telephone industry, as well as by other industries which own and operate microwave relay systems. This accumulation can have very serious effects on the transmission characteristics of the signal, and under adverse conditions, may completely disrupt service. Where certain antenna systems and long waveguide runs are a necessity in the layout of a microwave system, some means must be established to prevent these accumulations. Dry air supplied under low pressure is used in preventing such serious deterrents.

Mr. Jackson proceeds to discuss one of the larger equipments used to supply dry air to multiple antenna systems components. Shown in Figure 2 is a typical drying system.

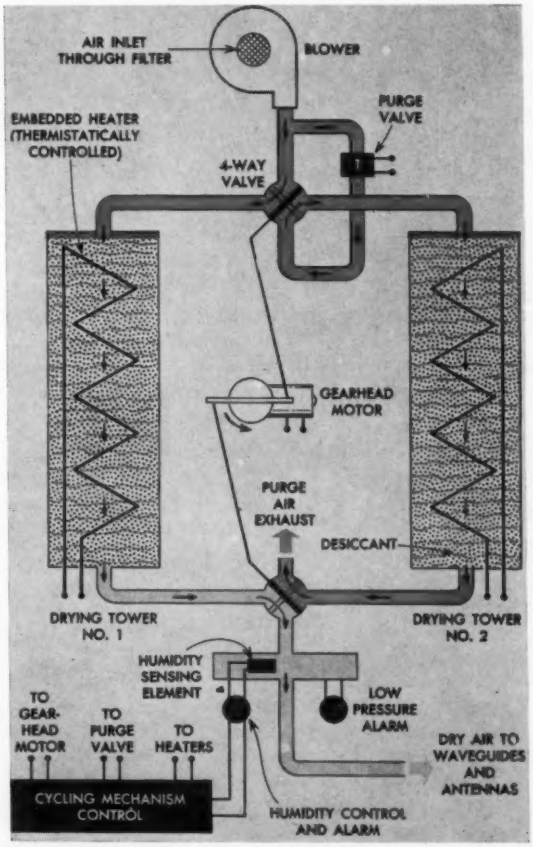


Fig. 2. Diagram of new equipment developed by Bell Telephone Laboratories to prevent the impairments in microwave radio transmissions which can be caused by moisture collecting in antenna and waveguide components.

The new equipment is said to consist of a centrifugal air blower, two drying towers filled with desiccant, and a humidity-operated cycling mechanism. In operation, one of the desiccant-filled towers is supplying dry air while the opposite tower is being reactivated.

The author states:

"The blower delivers ambient air to one of the drying towers where the moisture vapor is absorbed by the desiccant bed. Dry air is then piped to the waveguides and antennas. The quality of the air delivered to the waveguides is continuously monitored by a humidity sensing element.

"When the relative humidity of delivered air reaches a predetermined low value, the system is automatically cycled; the spent bed is purged with ambient air, and the air to be dried for the waveguides is routed through the second tower. Thermostatically controlled heaters which are embedded in the drying agent then reactivate the spent bed.

"The cycle of reactivation comprises periods of heating, purging, and cooling. The heated desiccant releases moisture, which is purged from the tower by a small flow of ambient air.

"When all moisture is purged from the tower, the thermostat turns off the heaters and the solenoid control valve stops the flow of ambient air. The reactivated tower is cooled by radiation until the apparatus recycles."

It was pointed out that one single tower may be used for a minimum period of 12 hours under the severest conditions, and where temperate conditions exist for a period of several days. At main and terminal microwave stations, a larger unit may furnish up to 400 cubic feet of dry air per hour.

HARDENED MICROWAVE

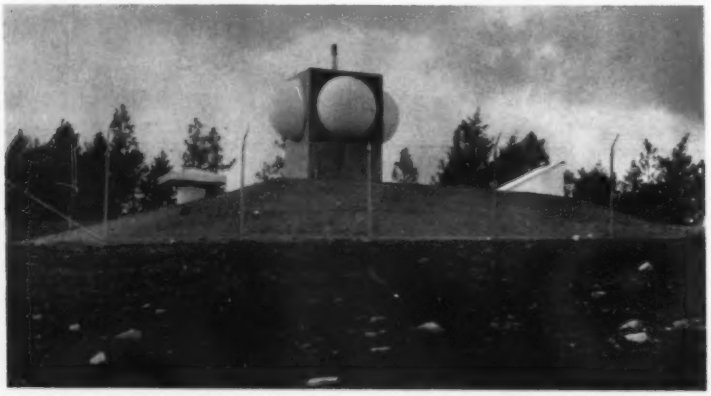
A MICROWAVE network engineered for protection from overpressure ground shock waves up to 25 psi has recently been completed for the Fairchild Atlas complex by Collins Radio Co.

Photo illustrates the design that went into the Fairchild Atlas complex. Shock mounts installed beneath equipment racks at underground bunkers allow equipment to withstand over-pressures of up to 25 psi.

The new system utilizes Collins MX-103 carrier multiplex superimposed on frequency diversity r-f equipment, also designed by Collins. The system is being used to provide highly reliable circuits from a command control post at SAC's Fairchild AFB located near Spokane, Wash., and several widely dispersed launch sites.

Frequency diversity techniques are employed to provide the required reliability. This feature provides the required reliability by transmitting simultaneously on two widely separated frequencies, thus reducing the probabilities of circuit outages due to fading.

To further "harden" the network, float-charge battery supplies of 24, 48, and 130 volts provide for operation of all equipment. Reserve of the battery supply is said to be eight



These antennas, a component of a hardened microwave network, serve widely dispersed Atlas launch sites and a SAC command post near Spokane, Wash. Designed to resist shock, radomes fabricated of high strength plastic nearly an inch thick and mounted on concrete pedestals protect 4 foot microwave antennas.

hours in the event of a primary power failure.

A fault alarm system "built-in" to the network reports to the control center as many as six malfunctions from each of the terminals. Fault detections include battery charge failure, diversity path alarm, r-f and carrier fuse alarm, and unauthorized building entry.

TIME ADJUSTMENTS

THE NATIONAL Bureau of Standards on Aug. 1, 1961, at 0000 UT (Universal Time), advanced the phase of the time signals being broadcast by radio stations WWV and WWHV by 50 milli-seconds.

Since early 1960, under agreements by various agencies in the United States and the United Kingdom, coordination of standard frequency broadcasting stations has been maintained. The maintenance of coordination of standard frequency broadcasting stations is the fulfillment of a more uniform time and frequency transmission necessary in the solutions of many scientific and technical problems in many fields of communications, tracking of satellites, etc.

Standard frequency broadcast stations participating include those of GBR and MSF at Rugby, England; NBA, Canal Zone; WWV, Beltsville, Md.; and WWVH, Hawaii.

RADIO INTERFERENCE

THE ARMOUR Research Foundation will conduct a seventh conference on "Radio Interference Reduction and Electronic Compatibility" at the Illinois Institute of Technology on Nov. 7, 8, and 9.

Main topics to be discussed at the conference will be the requirements and problems pertaining to the Department of Defense's electromagnetic compatibility program.

The conference will be conducted in cooperation with the Institute of Radio Engineers' professional group on radio frequency interference and will be sponsored jointly by the three military services.

Among topics to be covered at the sessions are design and measurement techniques, data processing and display methods, control and reduction of interference, and interference prediction techniques.

Papers presented at this conference which are considered to be of interest to our readers will be discussed in this column.

how to get FCC licenses for your technicians

(without sending them to school)

The greatly increased use of mobile communications and microwave relay systems by the telephone industry is creating a serious problem . . . how to get FCC licensed technicians.

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A must for loading docks, cab stands, lumber yards, etc. Regardless of the weather, this phone performs with indoor dependability. Locking door limits use, prevents abuse.

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The answer to a modern homemaker's dream. This compact phone is half the size of a regular phone. Choice of six colors. Dial light can be turned from soft to bright or completely off, anytime.

Each person in your area has specific telephone needs. Take the dock hand. He needs an outdoor phone that performs in any weather. Mrs. housewife, on the other hand, wants a phone that adds new beauty and color to her home. You can sell both...

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Any new customers in your area? Any old ones with new telephone needs? If so, show them the AE phone best suited to their particular needs. Contact your AE representative. He'll be glad to give you full details on our complete line of telephone services and related instruments. Only AE offers 15 different phones to meet different customer needs.

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Annual Review

New Developments in Telephony

By RAY BLAIN, Technical Editorial Director

THIS IS THE seventh article in a series describing various new items of equipment and their application in the telephone business. The first article appeared in the July 15 issue; the second: July 22; third: July 29; fourth: Aug. 5; the fifth: Aug. 12, and the sixth: Aug. 19.

Readers desiring additional information on any of the products described should write the manufacturers or TELEPHONY.

* * * *

Loading Coils Encapsulated in Clusters. (Fig. 66.) A method of packaging loading coils, termed unique, has been developed by Cook Electric Co.'s engineers. Groups of 5 or 10 coils arranged in a flat cluster are completely encapsulated in moisture-proof plastic material. Terminals or plastic-insulated leads are connected to coil windings before encapsulation.

This method was developed specifically for use of the coils in a loading coil case, which can be opened while in service for the addition or removal of coils. The objective is economy of loading through investment in the optimum, rather than the maximum number of coils on the initial installation, as well as saving additional splices which would be required where the initial number of coils proved inadequate in the conventional type permanently sealed loading pot.

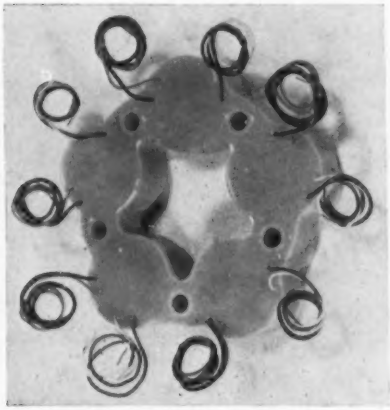

Fig. 66. Loading coils encapsulated in clusters.

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Terminal Block with Adjustable Mounting Bracket. (Fig. 67.) The new

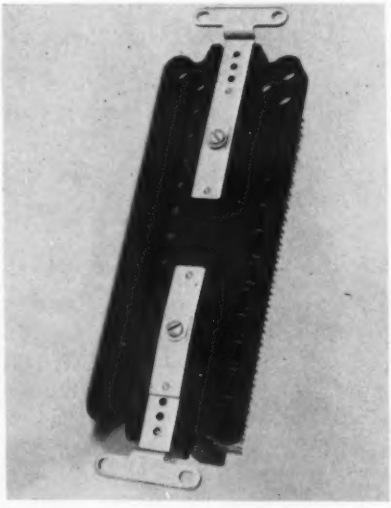

Fig. 67. Terminal block with adjustable mounting bracket.

Cook Electric #130 Terminal Block is said to be proving itself as a valuable item for operating companies. The bakelite base for the block is fitted with end-mounted brackets which can be adjusted quickly for mounting on centers of 7½-inch, 8-inch, 8½-inch or 9-inch.

Cook says that this feature will help to reduce the inventory of terminal blocks and assure the availability of a block readily mountable on several mounting centers. The block may also be mounted with center-mounting brackets for channel-end mounting, either vertically, or horizontally.

This universal type block includes terminal clips having three notches on both sides for multiple wire connections.

•

Hotel and Motel "Message Waiting" Lamp Power Supply. (Fig. 68.) The Lorain Model T14 power supply unit provides 0.15 ampere at 190 volts dc

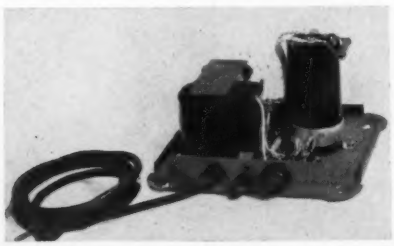

Fig. 68. Hotel and motel "message waiting" power supply.

(nominal) for message-register lamps, and for other uses requiring the above power. The unit is compact, being only 8 inches x 8⅞ inches x 5¼ inches overall. The circuit includes a filter; and maximum output is 210 volts.

Model RB2G19, dc to dc converter, with isolated output, is also available for message-register purposes, Lorain states; and provides 65/48 volts dc at 2 amperes from a 48-volt office battery.

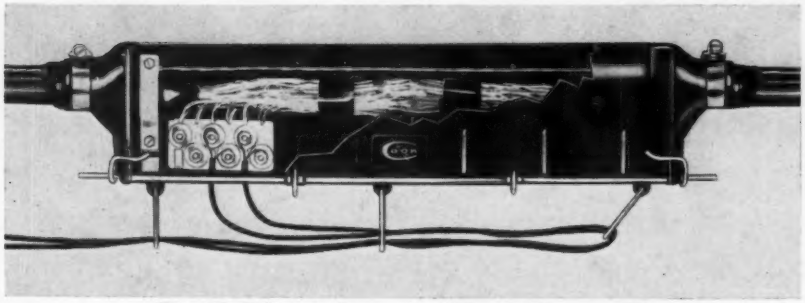

Fig. 69. Splice enclosure for "Figure 8" type cable.

Splice Enclosures for Figure "8" Cable. (Fig. 69.) New types of plastic cable with an integrated, but separately enclosed supporting strand have been followed by a new design of splice enclosure, the Cook Splice Coat. Cook Electric says that its splice coat will enclose both cable and strand. Special interior clamps encircle the cable, clamp to the strand, and support the metal base plate. The clamps thus provide a continuous ground connection from strand to cable shield and to the metal mounting plate for terminals.

This same unit with an adapter kit can be used for lashed cables, the company points out, thus offering flexibility of application, with a minimum of parts inventory.

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Pre-Stubbed Central Office Protectors. (Fig. 70.) Refinements in design

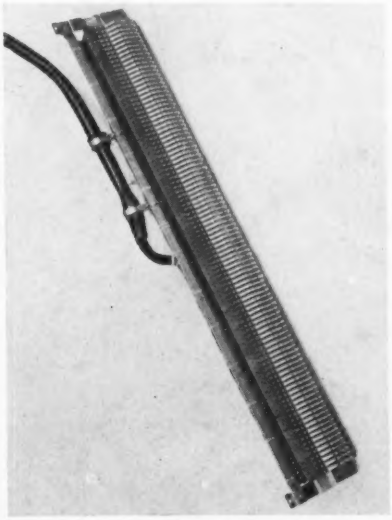


Fig. 70. Pre-stubbed central office protectors.

and factory procedures for connecting plastic cable stubs to central office protectors have improved the pre-stubbed 3800 Central Office Protector produced by Cook Electric.

The company explains that a new support bar welded to the back of the protector block serves these three functions:

(1) As anchor for a cable which supports the weight of the stub.

(2) As a grounding bar for a clamp which encircles the cable butt with contact around the metallic shield to effectively ground the shield.

(3) As a tie support for the hand-formed cable form. Insulating tape protects the cable form where it is tied to the bar.

Cook also says a new shipping carton provides complete protection for a single protector block with its attached cable.

•

New High-Strength Telephone Line Wire. (Fig. 71.) Alumoweld, a high-

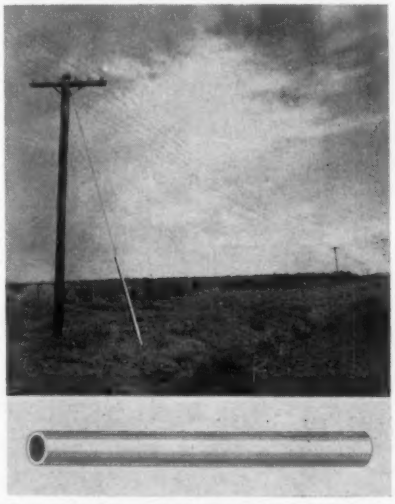


Fig. 71. New High-strength telephone line wire.

strength telephone line wire, has been introduced by the Copperweld Steel Co. for use on overhead communication lines.

The manufacturer states that this line wire offers the telephone industry a low-cost wire combining the strength of steel with the corrosion resistance, conductivity and light weight of aluminum. The thick aluminum covering comprises 25 per cent of the area of the wire, and according to Copperweld, is bonded "continuously and permanently" to the steel core.

High strength and light-weight, Alumoweld wire is said to be suited for use on all types of open wire lines, particularly those utilizing special long-span construction. In addition to the mechanical advantages of this wire, the company states that the thick covering of aluminum provides excellent transmission properties, especially at carrier frequencies.

A complete line of compression and spiral-type fittings also is available for this conductor.

•

Preformed Splices for Alumoweld Strand. (Fig. 72.) This splice is de-

Fig. 72. Preformed splice for Alumoweld strand.

scribed as safe and easy to apply by hand. The application can be inspected visually.

Preformed splices made of Alumoweld wire hold 100 per cent of rated breaking strength. Also, the design of the splice permits cable lashers to traverse the spliced portion of the messenger, giving a neat, finished appearance.

•

Preformed Bronze Armor Rods. (Fig. 73.) Preformed bronze armor rods are

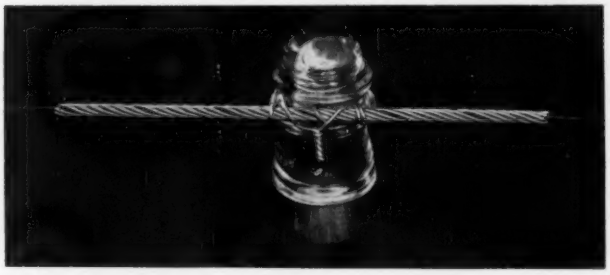
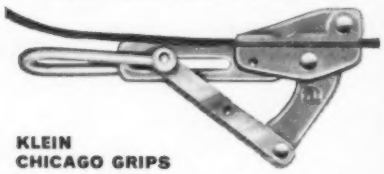


Fig. 73. Preformed bronze armor rods.

FOR THE
LONG, HARD
PULL

Whether it is a block and tackle, grips or snaps, you will find a wide variety illustrated and described in the Klein Catalog.

Klein equipment is specially designed for the tough, hard use that it receives in stringing power or communication lines. Grips, hooks, snaps are all drop-forged in Klein's own forge shop to assure maximum strength. All equipment tested to stand loads in excess of safe load indicated.



KLEIN CHICAGO GRIPS

This family of grips suitable for bare wire, solid or strand. You will find a complete selection of grips for every type of conductor in the Klein Catalog. Jaw length and design of groove combine to eliminate conductor damage.

No. 1628-5—available with plain jaws or bronze-lined jaws. Maximum openings from .198 to .522 inch.

SELF-LOCKING BLOCK TACKLE

One of a specialty line of Klein block tackles with steel shell blocks and drop-forged hook. Rope is of highest quality Manila. Safe load, 1200 lb.

No. 1802-30 furnished with detachable hook, as shown. No. 1802-30S furnished with detachable swivel anchor hook.

SWIVEL HAND LINE SNAP

The only drop-forged snap of this type on the market. Has swivel clevis and quick-acting plunger latch. Will take ½-inch or lighter hand lines. Safe load, 750 lbs. No. 470.

FREE TOOL GUIDE

Write for 103TG Tool Guide covering complete Klein line.

ASK YOUR SUPPLIER

Foreign Dist: International Standard Electric Corp., N. Y.

Mathias Klein & Sons
7200 McCormick Road, Chicago 45, Ill.

applied over insulation, protecting the wire from tie-wire damage or abrasion. Application is said to be quick and easy by hand.

These bronze armor rods are produced in two lengths: 12-inch for normal ties; and 24-inch for transposition ties.

The Preformed bronze armor rods were recently approved for REA's corrosion-resistant construction.

•

Cabled-loop Guy-grip Dead-ends for Alumoweld Strand. (Fig. 74.) This new item, in common with the field-confirmed cabled loop guy-grip dead-ends, is said to be compatible with Alumoweld strand.

Fig. 74. Cabled-loop, guy-grip, and dead-ends for Alumoweld strand.

Also designed to hold 100 per cent of the rated breaking strength of Copperweld's Alumoweld strand; it is available for all sizes of strand now being produced.

•

Preformed dead-ends for false dead-ending. (Fig. 75.) The company says that this item provides a fast, safe, economical method for false dead-ending of strand. It is applied without tools; no cutting of messenger; no strand threading; no bolts to tighten or clamps to slip; no jaws to seat, and no concentration of stresses.

Preformed describes its neat appearance; and says it is designed to hold the full-rated strength of the strand on which it is applied.

•

Multi-pair Distribution Wire. (Fig. 76.) General Cable Corp. has recently developed an improved type of multi-pair distribution wire. Its "Figure 8" configuration provides mechanical protection to the core; and, according to General Cable, shows less deviation in dry versus wet electrical characteristics.

This new wire is being manufactured in sizes up to 18 pairs, in gauges 19 or 22 AWG, solid, annealed uncoated copper.

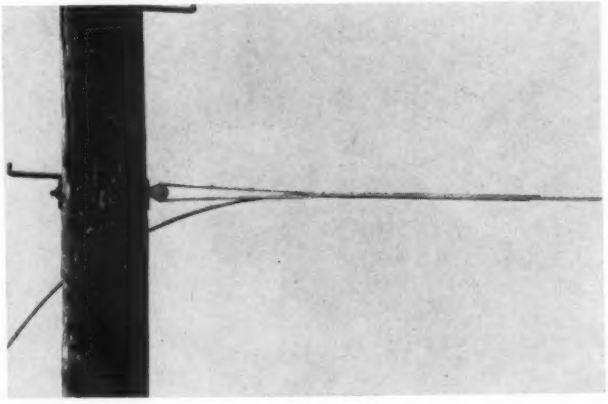


Fig. 75. Preformed dead-ends for false dead-ending.

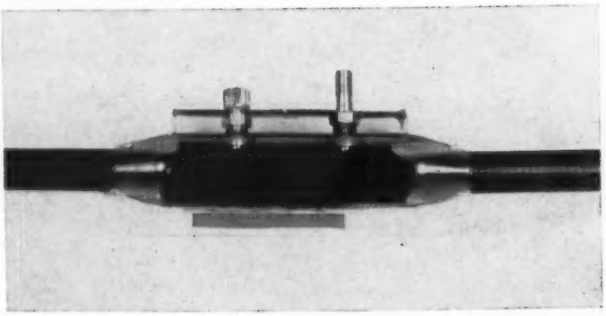


Fig. 77. Cable splice and plugging device.

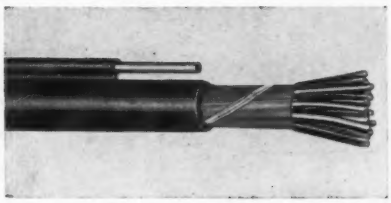


Fig. 76. Multipair distribution wire.

It is fully color-coded, with polyethylene insulation and core tape. The jacket is high molecular polyethylene.

The "figure 8" design incorporates 0.109-inch galvanized steel support wire; for long span construction, an 0.134 galvanized support wire can be provided.

•

Cable Splice and Plugging Device. (Fig. 77.) C & S Products Co. is offering Semper-Seal, a new epoxy-type resin, termed durable, able to seal weather-tight and with transparent clarity for complete encapsulation. The qualities of this seal, C & S states, enable field splices and pressure blocks to be accomplished in a minimum of time with the visible assurance that a solid seal has been made.

Semper-Seal is a two-part compound consisting of a resin and hardener, which, when mixed together, create a thermosetting action. C & S states that the compound, through its own chemical change, will, in 30-45 minutes, become a solid, clear, air-tight seal.

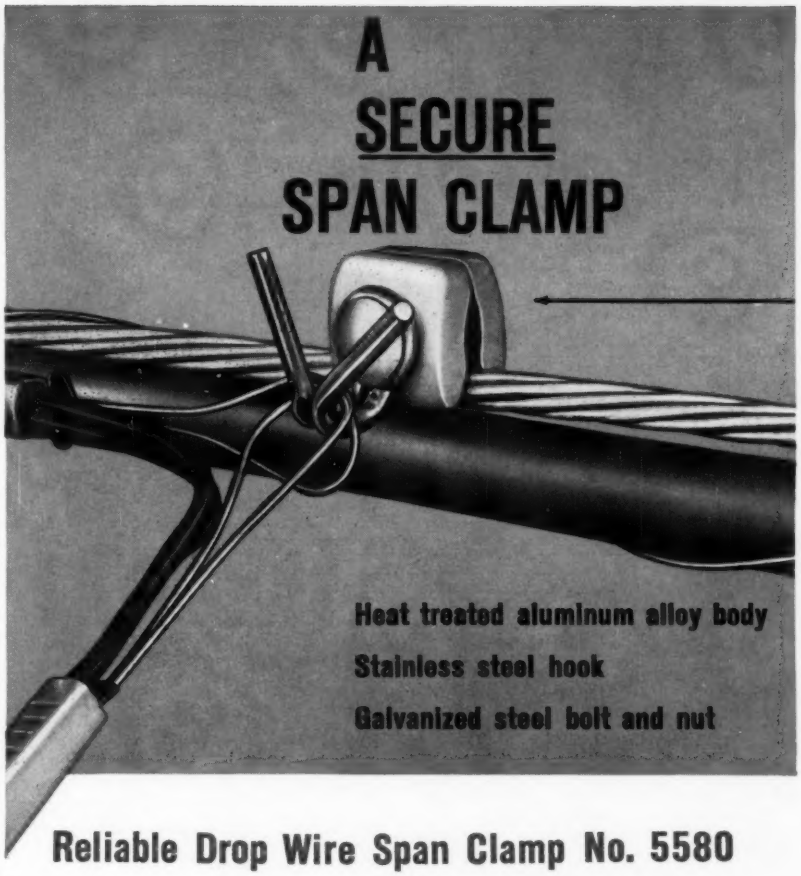
Also, the heat index during the curing process is very low and will not cause any deformation or disfiguration of the thin walls of polyethylene-insulated conductors.

Low viscosity enables Semper-Seal completely to encapsulate conductor interstices, effecting a solid block, yet not running back more than 1 inch to 2 inches beyond the sheath opening, the company says. Because of the quick setting action, pouring of the cable block is permitted in a horizontal position without excessive run-back into the cable core. Resistance to heat, moisture, pressure and other environmental and operational conditions has been tested extensively in lab and field.

C & S Products adds that this device has proved itself for connecting pressure tubing to plastic-jacketed cable, as indicated in Fig. 77. Sealing is called economical, fast, and foolproof.

•

The Saturable Inductor. (Fig. 78.) An answer to the loop bridging problem has been achieved by Communication Equipment & Engineering Co. in its saturable inductor as a party line bridging device. This device is known as the C1574A Inductor.



Reliable Drop Wire Span Clamp No. 5580 for 1/4" to 7/16" strand

Accommodates 1 to 3 mid-span drops under full tension (plus wind & ice loading). The stainless steel "Y" shaped hook will take several drop wire clamps. Take-offs can be made at any angle. The square shank bolt, with nut, tightens securely with a wrench.

Send for your sample now.

Reliable
A Symbol of Integrity Since 1909

ECTRIC COMPANY
Franklin Park, Illinois

DATE_____

Please send me a sample Span Clamp

NAME_____

COMPANY_____ POSITION_____

STREET_____

CITY_____ ZONE_____ STATE_____

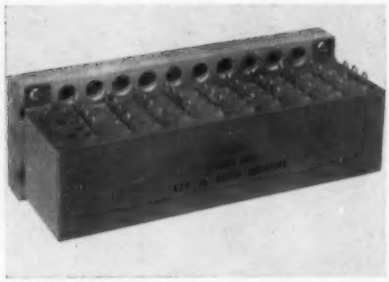


Fig. 78. The saturable inductor.

For the past several years, operating telephone companies have been making an all-out effort to provide telephone subscribers with transmission quality consistent with modern switching methods. Not the least of the many problems in this connection is that of retaining a practical degree of flexibility in distribution plant without added amounts of bridged tap which could offset any gain in the improvement of toll, trunk and loop plant combined.

One serious transmission loss is created by bridging loaded and non-loaded subscribers' loops with a non-loaded bridged tap. This practice results in serious distortion, and very often, extreme reduction in transmission, due to high loss in the frequency band containing the majority of speech power.

The CEECO inductor is connected in each bridged leg, and acts as a switch. When dc is not flowing through the inductor, its impedance is high; i.e., greater than 10,000 ohms at 1000 cps. When dc flows in the circuit, as when a bridged telephone is off-hook, the inductor impedance drops to less than 50 ohms.

Under normal line current conditions, i.e., 20 ma. or more, the transmission loss of the inductor is about 0.1 db at voice frequencies. When there is no current flowing through the inductor, under on-hook telephone bridging conditions, the bridging loss is about 0.05 db. The inductor has a dc resistance of approximately 10 ohms per winding. Its insulation resistance, dielectric strength and crosstalk characteristics are equal to an approved-type loading coil.

•

Outdoor Telephone Jack. (Fig. 79.) This new Suttle outdoor weatherproof jack assembly is reported to meet the fast growing demands of subscribers for outdoor, backyard, or patio telephone service. This jack is suitable for outdoor use. The non-corrosive, waterproof, aluminum and stainless steel receptacle houses the standard telephone jack.

The outdoor jack assembly may also be used at boat docks, marinas, construction sites, fairs, sports arenas, stadiums, and any location where an outdoor telephone instrument using the four-prong plug is desired.

The cover is aluminum, spring-tensioned to snap tight on the rubber waterproof gasket when not in use. The hinge pin and spring are of non-rusting stainless steel. The threaded aluminum entrance cap houses an aluminum bushing and a heavy duty neoprene rubber plug, holed to accept standard inside-outside telephone wire.

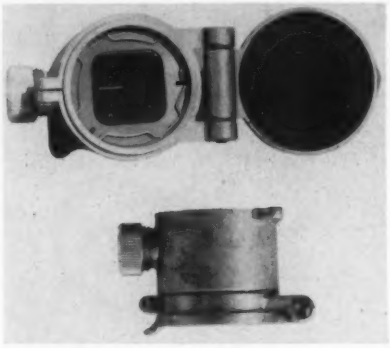


Fig. 79. Outdoor telephone jack.

•

Telephone Push Buttons. (Fig. 80.) For use in intercom systems and for audible signaling needs, Suttle has designed this modern series of one, two, four or eight-button push buttons. The housings are solid, executive-type, blue-beige plastic. Base cork pads to prevent scratching are included. Screw terminals, including screws, are provided with each unit. These push buttons are designed for use at normal telephone, house, or office voltages.

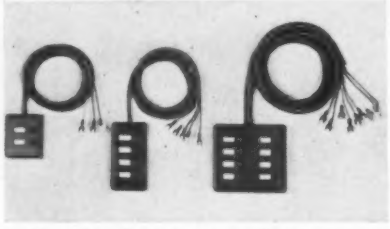


Fig. 80. Telephone push buttons.

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Telephone-Type Buzzer (Fig. 81.) The SE-7 Suttle buzzer series is intended for either dc or 50-60 cycle ac operation. Manufactured under Western Electric patent license, these buzzers are equipped with silver contacts and reed mounted armature with a flat retractile spring and stop.

For ac operation, connections are made directly to the coils, eliminating the make and break contact, and the need for contact maintenance. These buzzers will normally operate without adjustment on the voltage range specified. The minimum effective resistance to dc or impedance to 60 cycle ac of this buzzer is approximately three times the nominal dc resistance.

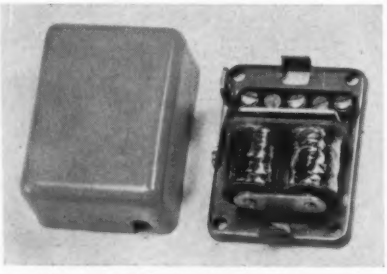

Fig. 81. Telephone-type buzzer.

•

Condex® Multiple-Duct Concrete Conduit. (Fig. 82.) Gagne Enterprises, Inc. reports that its Condex conduit is manufactured to rigid specifications and can be produced in three different types to meet users' demands in various sections of the country. These types are:

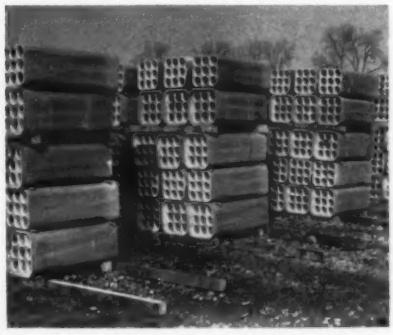

Fig. 82. Condex® multiple-duct concrete conduit.

Bell and Spigot.

This conduit is available in 2-4-6-8 and 9 duct units. It eliminates the need for plastic or mortar bandages and dowel pins for sealing and alignment of joints. The joint is said to be quickly and economically sealed by means of a joint sealing compound applied with a pressure gun.

The bell ends have steel reinforcing to prevent breakage and the possibility of future misalignment of ducts at the joints. It can be installed, Gagne says, as fast as the most modern trenching machine can open the trench, and requires fewer men than do other types of conduit which require couplings, plastic sleeves or mortar bandage joints. Backfilling operations can follow immediately behind the placing crew and thus assure quick restoration to original ground surface conditions eliminating the hazards of open trenches and barricade expense.

Double Tenon.

This is available in only 3 and 6

(Continued on page 50)

This Thing Called Automation

By ALEXANDER I. WARRINGTON*

THE UNITED STATES has during the 20th Century asserted strong leadership in efficient production. Other nations have attempted to catch up with and surpass the United States, and note will be taken of the outcome of this race at the end of the century.

Be that as it may, the significant observation is that processes and techniques, known in the aggregate as "automation," are international in scope. This is expressive because it means that automation is a movement which is destined to grow in greater proportions than has been the case in the past.

The telephone industry throughout the world has engaged in constant research with the ultimate objective of rendering better service at lower costs. (It is realized that taxes are a part of costs. However, taxes will not be discussed in this release since it would create confusion. Taxes will, however, be treated at some early future date.)

This brings us to the most vital issues in politics, labor, economics, sociology, and management with respect to automation in the telephone industry. The crux of this rather delicate situation can probably be handled most easily with the following questions and answers:

(1) *Question:* Has labor increased numerically in the telephone industry since 1900?

Answer: The needs for labor have increased steadily in the United States and throughout the world since 1900.

(2) *Question:* Have jobs, directly associated with the telephone industry increased or decreased since 1900?

Answer: They have greatly increased.

(3) *Question:* It is not surprising that Questions 1 and 2 are answered in the affirmative. The real question is this: Were it not for stepped-up automation, wouldn't the telephone industry in the United States now be employing 1.5 million instead of 0.7 million, and wouldn't there be one million jobs directly dependent on the telephone industry instead of 0.5 million?

Answer: No, and the assumptions that created the question are false.

(4) *Question:* The assumptions appear reasonable. Why are they false?

Answer: For many reasons, of which only a few can be touched upon in this "question and answer" session.

The increase in jobs in the telephone industry is the direct result of expanded and improved service at relatively lower costs.

This is the only way it has been possible to secure a higher degree of public acceptance of telephone service. Vital as telephone service is to the individual, the community, and the world, it is not comparable to such needs as water.

(5) *Question:* Then, the point is that telephone service goes deeper than merely taking care of population expansion?

Answer: That is precisely the point.

Summarizing our observations up to this point, we note that jobs in the telephone industry and jobs directly dependent upon the telephone industry have steadily increased because of those forces at work, nationally and internationally, popularly known as automation.

The Bell System, for example, has increased its labor force 2.5 times since 1920 when dial conversion began. As to general reduction in costs to customers, a three-minute cross-country telephone call today is $2.25 compared to $16.50 in 1920.

It is true that automation has eliminated, perhaps forever, many jobs, and it has also destroyed a great deal of drudgery. Automation in the telephone industry has also created new industries and new jobs.

One can get some idea of the complexities and the economic interdependencies of the economics of communication by noting the following topics on which information has been developed by the Bell System:

(1) The effect of Bell System automation in improving the communications system of the country, while keeping the cost of service down.
(2) The contribution of Bell System technological progress to the general economy, to the creation of new industries, and to the national defense.
(3) The effect of Bell System automation on investment in the business.
(4) The effect of Bell System automation on telephone employment, and on employment in other industries.
(5) What may be expected in the future from continued automation in the Bell System.

With growth there are growing pains, and that is unavoidable and inescapable. But with growth and improvements in telephone communication, we may look for a fuller and richer life in the years ahead. It has been said that nothing succeeds like success.

We conclude our examination, brief as it is, of telephonic automation since 1920 by saying that it has been successful in ushering in an era of better and more interesting jobs with a substantial gain in payrolls and national wealth.

*Mr. Warrington is an Industrial Economist of Baton Rouge, La.

The Plant Man's NOTEBOOK

By RAY BLAIN, Technical Editorial Director

WE HAD THE GENERAL idea that our world-wide communications were very good until we read an editorial by David Lawrence in *U.S. News & World Report* stating:

"The dilemma of our day is in the failure of mass communication. We cannot, or do not, speak to all the peoples of the Soviet Union, and of the other countries behind the Iron Curtain. Instead, only a dictator's voice is heard by enslaved millions as he distorts and twists, alarms and incites, even while he deprives his own people of a decent standard of living as well as liberty and freedom. He portrays an enemy bent on their destruction."

•

President Kennedy has what some people call "telephonitis," according to Drew Pearson. Mr. Kennedy likes to call friends on the telephone. It is claimed that sometimes after dinner he will go upstairs, read the newspapers, then start telephoning old friends to get their ideas on this or that. He finds it helpful to get fresh, first-hand reactions; also, it's relaxing—or so says Mr. Pearson.

•

We have a letter from our long-time friend Howard F. Van Zandt who is a representative for the International Standard Electric Corp. in Tokyo, Japan.

Mr. Van Zandt informs us that he has just completed his year as president of the Japan chapter of the Armed Forces Communications & Electronics Association. He also says that the International Rotary Convention, with 7,500 out-of-country delegates and their wives, met recently in Tokyo. He had a big job acting as an interpreter during the meeting. He is one of a very few Americans who speak Japanese without an accent.

•

The Southwestern Bell Telephone Co. is experimenting with recordings of subscribers reporting troubles on their telephone to a repair clerk.

The number of recordings made—and analyzed—depends on the total subscriber calls received. For example, the East St. Louis Plant Service Center records every 26th call. A beep tone informs the caller that a recording is being made.

The recordings from East St. Louis, as well as from other repair centers, are mailed to the plant observing group in St. Louis. Here, the recordings are played back, analyzed and tabulated.

An effort is being made to devise better methods of handling contacts and to improve service. These evaluations, comments and suggestions are sent back to the repair center for review, and for use as training material.

The observers who play back the records pay special attention to subscribers' comments and to the tone of voice, manner, and answers given by the repair clerk handling the contact. When tabulated, these scores also figure into the repair service index.

•

In the early days, telephone systems without switchboards were not uncommon. One of these systems was the Byron, N. Y. experiment in the 1890's.

Irving C. H. Cook, father of D. S. Cook, who is presently assistant manager of public relations for General Dynamics/Electronics, described the early Byron system as follows:

"In the early 1890's, a group of 14 farmers and others with similar ideas conceived the possibility that we might organize a company and construct a line to serve our rural community with telephone service. This was to be accomplished independently of any outside help or company, without establishing any 'central office' or depending on any telephone company for assistance. So far as could be learned, this venture was the first of its kind.

"This group had no central office for a few years, but each party had its own signal or number suggested by the Morse code in telegraphy. As time passed, it was realized that we must enlarge our scope to include more subscribers who were anxious for service. Consequently, a central office was established.

"It was decreed that a fee of 10 cents per call was charged to all who were not members of the telephone company for service rendered, while all bona fide members were entitled to free use of the same.

"Later, it was deemed expedient, and really necessary, to have outside or toll service; consequently we were incorporated as the 'Byron Telephone Co.' At that time, we had connections with the Inter Ocean Telephone Co., which later was known as the Home Telephone Co., with main offices in Rochester, N. Y. A short time thereafter, connections were made with the Bell Telephone also, and for the first and only time, to our knowledge, we had service through both companies over the same switchboard—a service rarely, if ever, acquired by any company."

•

Those interested in outer space should read a soft cover book of 136 pages titled, "Fundamentals of Radio Telemetry" by Marvin Tepper. This book may be purchased from TELEPHONY for $2.95.

Telemetry is closely related to missile and aircraft development for the exploration of outer space, because it makes possible the collection of data on which the improvement of existing rockets, missiles and aircraft is based. This exciting book covers the field of telemetry, explains its purpose and explores its techniques. Special sections are devoted to missile and satellite telemetry and hardware, and to data recording and processing. Specially prepared and carefully selected illustrations make important telemetry fundamentals crystal clear.

•

The writer recently enjoyed a ride in an Army helicopter from Washington, D. C., to Camp Lee, Virginia, and return. This flying banana flew the complete distance of a total of about 250 miles in 2½ hours.

Virginia is a truly beautiful state, and by flying over it at an elevation of about a thousand feet at this comparatively slow speed, it can really be appreciated and enjoyed.

"Cross Talk"

We are never too old to learn something foolish.

•

Alaska is now the only state in the Union claimed to be immune to termite attack.

THE Operator's Corner

By MAYME WORKMAN — TRAFFIC EDITOR

ISN'T THE telephone wonderful? One evening I was enjoying a television program—and the telephone rang. When I answered it, I heard the voice of a fine young man—Chip MacLelland.

He said, "A group of us are here in Oklahoma City and your name came up in the course of our conversation and we decided to call and have a chat with you." To say I was thrilled is a mild statement.

After visiting with Chip for a while, his charming wife, Carroll, came to the telephone. I had met her at the Oklahoma convention, and we talked about our first meeting. I am confident Carroll felt as I did, that we had been friends for a long, long time.

The next good friend to come to the telephone to chat with me was Ken Gillette. On a number of occasions it has been my pleasure to have Ken drop in at my home in Springfield, where Ken and all of my friends in the telephone industry are always welcome.

Sometimes I feed Ken, and sometimes he takes me out to dinner, and you may be sure that we have a wonderful time talking telephone and chatting about our mutual friends in the industry.

The next good friend to take over the telephone in Oklahoma to chat with me was Howard Housley from Dallas, Tex. I have enjoyed Howard's friendship for many years, and it is always a happy occasion for me when we have an opportunity to meet at a convention and take up the conversation where we left off at the last convention.

Last, but not least, Charlie Brown came to the telephone to visit with me. We talked for a spell, and then the conversation came to a close. I waited for Charlie to hang up the receiver, and when I heard it click, I was sorry the conversation with my friends had come to an end. However, I was also happy and glowing like a glowworm to think that they had taken time out from their get-together to give me a call.

The telephone is indeed a wonderful invention, and it has really come into its own in the past few years. Recently, an item appeared in my home town paper picturing a dairy farmer at his telephone, the spot from which he does his farming. Sound ridiculous? Well, it is absolutely true. Dairy farmer Jack Goby, who has a herd of more than 100 milkers just east of Rochester, Ill., tends his herd by telephone. The farm interphone system developed by the Bell System allows Goby to listen to, and even call his cows to the barn for milking—all from his kitchen. The speaker in his house is located above the telephone. From this, he hears the movement of the herd. By switching his telephone from his rural line, he turns on an elaborate speaker system around the barnyard. He can talk to the house, or many of his outbuildings, from a telephone by the cowshed.

After reading about Mr. Goby's equipment, we have come to the conclusion that the telephone will be used for many other things in the future besides conveying the human voice to distant places, which was its original purpose.

As indicated in the questions and answers in this series, the telephone is able to obtain prompt information on antidotes for all types of poisoning in communities that have a Poison Control Center. This may frequently result in the saving of a life, or of many lives, if people at a picnic, or other large gathering where food is served, should be affected by food poisoning.

This reminds me of the time roach powder was used for thickening gravy, in the kitchen of a central office, which resulted in making all the girls who had eaten the gravy violently ill. This error could have been most serious if the office had not been located in a large community where doctor and hospital service were readily available.

Wide Area Telephone Service (WATS) is another new feature of telephone service. It meets the needs of subscribers having substantial volumes of telephone communication over a wide area. WATS subscribers may contract for service in one or more of six prescribed calling areas, ranging from the first which permits them to reach telephones in all states contiguous to their home state, to the sixth which allows them to reach telephones in all states outside their home state except Alaska and Hawaii. Calls within the home state and calls to Canada are not included in this service at present.

WATS customers also have the choice of full-time or measured-time service. Subscribers who have full-time service may call as often as they like, and talk as long as they like, to any telephone within the specified area, excepting telephones of certain Independent companies which are not participating in the service. In the measured-time option the basic rate covers the use of the service for 15 hours of a month, and if this usage time is exceeded, the customers pay a fixed charge for each additional hour or major fraction of an hour. A subscriber may have one or more access lines to any of the six calling areas with either full-time or measured-time service, or both.

What will be next? Well, your guess is as good as mine.

Traffic Questions

(1) Whenever a subscriber is referred to the information operator for reasons not specifically covered in the operating practice, how should the situation be handled?

(2) If a subscriber reports trouble with his telephone, what should the operator say?

(3) What is a Poison Control Center?

(4) Define WATS.

(5) How is a WATS customer identified?

Answers to questions are on page 46.

Courts and Commissions

Ill. Commission OKs Test of Closer Burying of Cables

The Illinois Commerce Commission on July 25 granted Illinois Bell Telephone Co. and Commonwealth Edison Co. (Chicago-and-vicinity electric company) a limited exemption to Section 9 of the commission's General Order 160, which, among other things, requires that buried electrical power cables be separated from buried telephone cables by at least 12 inches of well-tamped earth.

The commission authorized the two companies to conduct field trials in which telephone and power cables are "installed at the same depth with random separation in a common trench . . ."

Terms and conditions specified by the commission included one that installations (not more than 100 separate jobs for not more than 10,000 separate building units) are to be completed prior to June 30, 1963, and that the last report (covering experience from July 1, 1963 to June 30, 1964) is to be filed by July 30, 1964.

It was noted by the commission that, in the opinion of Illinois Bell and Commonwealth Edison plus others, developments in the insulation and protection of the cables to be tested have rendered no longer reasonable, requirements in the commission's General Order 160 (issued Mar. 4, 1947) if certain other precautions are taken.

Among the terms the commission stipulated were these:

"The telephone cable shall consist of a core of fine gauge (19 to 26 gauge depending on transmission requirements) copper wires. The number of pairs in this core will vary with service requirements.

"The individual wires will be insulated with an extruded layer of polyethylene.

"The entire core will be wrapped with Mylar or Polypropylene.

"This wrapped core will be further sheathed in an 8-mil aluminum envelope and an outer 65-mil jacket of extruded polyethylene.

"Joint Attendance at Excavations to Clear Faults: If a fault should occur which requires the digging up of a cable buried under the terms of this order, neither petitioner shall begin such an excavation until a representative of the other is present, unless an emergency exists which requires immediate action. This requirement shall end on Jan. 1, 1964 unless otherwise ordered by the commission."

The commission also specified that in the approved field trials of joint buried cable construction, the power system is to consist of buried cable for use on alternating current, single-phase, 60-cycle, wye-connected system with grounded neutral, plus a nominal operating voltage of 7200/12,470 volts or 2400/4160 volts or less.

The telephone system is to consist of buried cable for standard low voltage telephone transmission. Also the metallic sheath of telephone cable is to be bonded to the power system, grounded neutral at intervals of not more than 1,000 feet.

Electrical characteristics of the power cables to be employed, as listed by the commission are:

"*Power Primary:* For use of 7200

volts, the cable shall consist of #4AWG, 19-strand tinned or alloy-coated copper conductor, strand-shielded with 19/64-inch wall of ozone-resistant butyl rubber insulation, a 30-mills-thick semi-conducting bedding or jacket over the insulation, and a covering consisting of twelve #14AWG tinned or alloy-coated uninsulated soft drawn copper wires wound spirally and spaced equidistant from each other around the circumference of the cable with a lay of from 5 to 7 inches, *or:* Cable consisting of #4AWG, 19-strand copper conductor, strand-shielded, with 14/64-inch wall of polyethylene insulation, a semi-conducting covering over the insulation, and a 5/64-inch lead sheath overall.

"For use at 2400 volts, the cable shall consist of #4AWG, 19-strand aluminum conductor, with 10/64-inch insulation of ozone-resisting butyl rubber, jacketed with 3/64-inch of non-conducting heavy-duty black neoprene, and a covering consisting of seven #14AWG, tinned or alloy-coated soft or annealed copper wire wound spirally and spaced equidistant from each other around the circumference of the cable with a lay of from 4 to 5 inches."

Incorporate in Kentucky

The Farmers Telephone Co., Upton, Ky., has filed for incorporation with 1,000 shares of no par value capital stock. Incorporators are: Hubert Vance, Willie Mabe, Grover Rider, Roy Caswell, Clifford McCandless, Don Coffey and Gilbert Caswell.

Deny O. Bell's Request for Rehearing on Toll Settlement

The Ohio Public Utilities Commission has denied a request by the Ohio Bell Telephone Co. for a rehearing of the commission's decision on the toll compensation complaint of General Telephone Co. of Ohio (TELEPHONY, June 17).

Under Ohio law, the Bell company may appeal this to the courts within 60 days.

The commission on June 9 had issued an order in General's complaint against Ohio Bell pertaining to the allocation of costs and the resulting division of revenues between the two companies, realized from long-distance calls within the state when the toll facilities of both companies are used.

In a similar case, General Telephone Co. of Kentucky has filed a suit in Franklin County Circuit Court, asking that an order of the Kentucky Public Service Commission be vacated and set aside (TELEPHONY, Aug. 5).

Wis. EAS Rate Hearing

The Wisconsin Public Service Commission on Aug. 24 was to have heard the petition of the General Telephone Co. of Wisconsin for authority to raise its rates at Two Rivers in connection with dial service; and the requests of Wisconsin Telephone Co. and General to establish extended area service between the Two Rivers exchange and Wisconsin Bell's Manitowoc exchange.

Tenn. Commission Considers Southern Bell Toll Request

A petition by the Southern Bell Telephone & Telegraph Co. to revise long distance rates in Tennessee on Aug. 21, was taken under advisement by the Tennessee Railroad & Public Utilities Commission (TELEPHONY, July 15).

Bell company officials told the commission at a public hearing that the proposed rate revision is to encourage greater use of direct dialing on long distance calls. They said they did not know whether the revision would bring the company more revenue.

Objections to the request were filed on behalf of the cities of Chattanooga, Memphis, Nashville, Whitwell and Red Bank-White Oak. The municipalities contended that the rate revision eventually would lead to higher toll charges.

J. M. Brown, commercial manager for Bell in Tennessee, testified that the revision would reduce rates on

(Continued on page 46)

IT, TOO!

One usually thinks of better service as being more costly. But—you can have better toll service AND added revenue when you install **North Electric Premium AuTollizer®** automatic toll ticketing equipment! Hard to believe? Ask the man from...

THE DYNAMIC FORCE IN THE TELEPHONE INDUSTRY

NORTH ELECTRIC COMPANY

GALION, OHIO

AE has the right equipment for your direct burial installation

What do you need for economical, easy-maintenance burial? Do you need a cable that handles easily, installs quickly? *AE's got it* in General Cable DS Qualpeth. It's specially engineered for fine underground transmission.

Need the economy of polyethylene construction in distribution wire? *AE's got it* in Alphaduct armored wire.

Need sturdy housings with easy access to terminals? *AE's got 'em!* Need loading coils that insure noiseless transmission? Bright warning signs to prevent digging up of your cable? *AE's got 'em!*

To get any or all of these essential buried-plant products, just contact one man—your AE representative. He'll give you full details on all of them.

AUTOMATIC ELECTRIC

Subsidiary of

GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM

WAREHOUSES:

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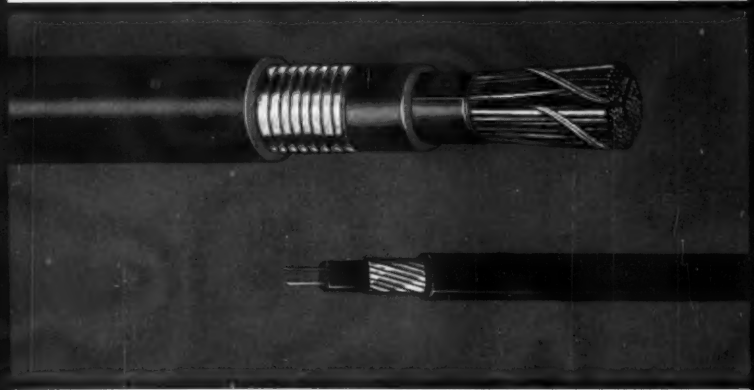
Illinois	Richmond 21, Va.	Portland 10, Ore.	Johnson City, N. Y.	Kansas City 8, Mo.
Fillmore 5-7111	ELgin 8-9280	CApital 3-7244	RA 9-4996	HArrison 1-7575

AE TYPE 60 LOADING COILS. High-voltage coils for use with today's plastic cables. Order them singly or in assemblies of 3, 6, 12, 18, 25 or more coils. U-shaped clips snap on to assemblies to make installation quick and easy.

TERMINALS give easy access to all cable pairs for testing, splicing, loading, protection, cross-connecting and wire distribution. All steel housing. Pedestal type or pole-mounted models. Sizes to accomodate 6 to 400-pair cable.



DS QUALPETH by General Cable. Double polyethylene, plastic-insulated cable gives you extra protection. Choice of aluminum or copper shielding. In conductor sizes 26, 24, 22, and 19 AWG. From 6 to 400 pairs.

ALPHADUCT ARMORED UNDERGROUND DISTRIBUTION WIRE. Available with extra-rugged rubber insulation and neoprene jacket, or with economical polyethylene insulation and jacket. Both types have flat steel ribbons wrapped around insulated conductors.

WARNING SIGNS in eye-arresting yellow field with red and black letters. Gives visible location of cable route, provides protection against digging or trenching. Heavy gauge steel frame. Post is plastic coated to resist corrosion.

SPEED UP POLE LINE REPAIR WITH

RUST-RID

Spray rust away instantly—here is the fast, simple and effective way to free corroded nuts, bolts, studs, pipe threads and other pole line hardware. You can spray from any angle—and reach into places that would usually be inaccessible.

TELEPHONE SPRAY PAINT

Touch-up Spray Paint Matching Color Green

Here is the perfect way to do your emergency touch-up painting on passenger cars, commercial vehicles and other equipment where the "Telephone Green" color is used. Dries within 5 minutes to a hard, glossy finish. Easy to use—always ready. Saves man hours and eliminates waste and mess of brushes and spray equipment. Durable on metal, wood or plastic surfaces. For interior or exterior use.

Full 16 oz.—12 to the carton

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LOS ANGELES

Order from your Telephone Supply Distributor

station-to-station calls, and in some instances, increase charges on person-to-person calls.

Mr. Brown listed the following as major provisions of the company's proposals:

Lowering the initial period on daytime station-to-station calls from three to two minutes, with the third minute costing one-half of the price of the two-minute call.

Reductions during the day, on initial period calls of 14 miles and more.

Reductions on daytime person-to-person calls for an initial period, with the night rate to vary and some calls to be cut and others to be increased.

Elimination of the present discounts on person-to-person calls at night and on Sundays.

Mr. Brown also told the commission that revenues of the company could go up if residents of Tennessee used more of the person-to-person calls. He said this was considered by Bell as secretarial service, and it justified the extra cost.

By Sept. 1, Mr. Brown continued, an estimated 490,000 subscribers in Tennessee would be able to dial their own station-to-station long-distance calls. He said this figure represents about 72 per cent of the Bell subscribers in Tennessee.

Merger Approved; Northern O. Telephone Plans Cut-Over

The Northern Ohio Telephone Co., Bellevue, on June 30, took over the operation of the Wellington Telephone Co., whose stockholders on May 17 had approved the merger (TELEPHONY, June 10).

Ohio Public Utilities Commission approved the merger on June 30, at which time Northern began operation of Wellington as a new exchange.

The Wellington exchange provides common battery service to 2,500 stations. Northern Ohio Telephone, according to Paul H. Kaufman, director of public information, plans to construct a new telephone building, will convert the exchange to dial service, and also proposes to establish DDD on cut-over.

Robert D. Gott continues as manager of the Wellington exchange.

Southern Bell Files Suit In La. for Relocation Pay

The Southern Bell Telephone & Telegraph Co. filed suit in district court at New Orleans, La. on Aug 4 for $55,575, which it charges, the Louisiana Department of Highways owes for the relocation of certain telephone lines.

The State Department of Highways was named defendant in the suit.

Southern Bell charged that it has relocated lines at 18 different locations along navigable streams to allow the widening or relocation of highways along those streams. In each instance, the petition stated, the lines were relocated with the understanding that the company would be reimbursed for the actual cost of the facility less depreciation.

C. C. Bird, attorney, said the action filed is not directly related to the present question of whether the state and federal governments or the utility companies should pay for the relocation of utility facilities along the route of the Baton Rouge Expressway.

General Tel. of Florida, St. Joseph T&T Ask Raises

The Florida Railroad & Public Utilities Commission has set a Sept. 19 hearing date on the application of the General Telephone Co. of Florida for a rate increase.

The company is asking to raise its rates by an amount which will enable

Answers To Questions on Page 41

(1) Handle the situation to the best of your ability, making suitable explanations where it is advisable and rendering any assistance that you can.

(2) The operator should say: "One moment please, I'll give you repair service." Or, if locally directed, say, "That is handled by repair service. You can reach it by dialing (code)."

(3) Poison Control Centers have information on antidotes for all types of poisoning and are usually located in hospitals. All communities do not have a Poison Control Center.

(4) Wide Area Telephone Service, referred to as WATS, is a new telephone service to meet the needs of customers having substantial volumes of telephone communication over a wide area.

(5) WATS subscribers can be identified by 7-digit telephone numbers beginning with either the numeral "0" or "1".

it to earn a 7.25 per cent return on its net investment.

•

Also in Florida, the commission set for hearing on Sept. 6 the petition of the St. Joseph Telephone & Telegraph Co., Port St. Joe, for a rate increase.

The St. Joseph company is seeking rates which will provide it a 7 per cent return.

Hawaiian Telephone Files $15 Million Issue with SEC

The Hawaiian Telephone Co. has registered a statement with the Securities & Exchange Commission, it was reported on Aug. 16, stating that the company plans to raise construction funds by selling 782,144 shares of its common stock.

Hawaiian Telephone said 711,040 shares would go out for subscription by its stockholders, and 71,104 shares for subscription by its employes.

According to *Wall Street Journal*, at recent quotations of about 19½ for Hawaiian Telephone common, the stock to be offered would have a gross market value of more than 15 million dollars. The *Journal* pointed out, however, that offerings to stockholders and employes are usually made at a price somewhat below the market value at the time of offering.

Bill Outlaws Wire Use to Send Gambling Information

A bill providing penalties of up to a $10,000 fine, or imprisonment for two years, or both, for anyone who knowingly uses "a wire communication facility" for interstate transmission of gambling information, was passed by the Senate on July 28.

Included in the final version of the bill, which was sent on to the House of Representatives, is a provision that common carriers, when notified in writing by a federal, state or local law enforcement agency, will discontinue service to the subscriber, but "no damages, penalty or forfeiture, civil or criminal should be found against any common carrier for any act done in compliance with any notice received from a law enforcement agency."

The bill, as originally submitted, did not contain this provision protecting the common carriers. United States Independent Telephone Association and Bell System representatives, at hearings on the measure, pointed out the burden this placed on telephone companies.

Purchase Hearing in Neb.

A hearing by the Nebraska Railway Commission was held on Aug. 15 on

GENERAL MACHINE PRODUCTS COMPANY, INC.

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C-R POWER REEL

SLACK PULLER

CABLE FEEDER

GMPCO

AERIAL TENTS
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CABLE BLOCKS
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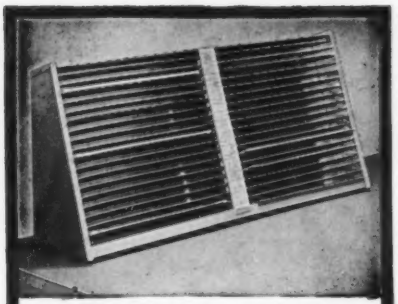


Trouble Recorder Card Rack

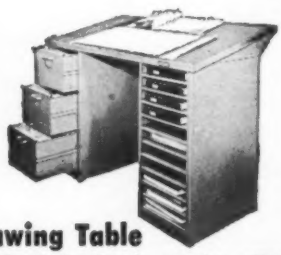
For fast orderly sorting of Trouble-Recorder cards, has 38 card slots in two banks with index strip between. Base is 38" by 8". Height 15". No. D-30325-1.

Telephone Office Equipment

to lighten your work and improve efficiency

Work Bench

For repair, assembly, test and paper work. Top drawer divided into 24 compartments for parts and tools. Large file drawers are for circuit drawings. 54" x 25" top covered with masonite. Height 36". Drawers may be inserted from back to reverse position of kneehole. No. D29978-3.



Drawing Table

For circuit drawing in crossbar offices, provides central location for reference material. Masonite top is 30" x 60". Height 36" at front, 42" at rear. Three large file drawers at left for drawings. Eleven shelves at right are 2½" high, 14" wide, 18" deep for sketches, sequence charts, book type SD sheets, trunk serials, etc. No. D30326-1.

Color of all units: Baked-on gray enamel unless otherwise specified.

TWIN POST
Neubauer
MANUFACTURING CO.
517 LOWRY AVENUE N.E.
MINNEAPOLIS 18, MINN.

an application by the Wood Lake Telephone Co. for permission to purchase the Kilgore Telephone Co.

Bill OK's Sale of Indian Bureau's Utility Facilities

The Interior Department would be allowed to sell government-owned telephone and electric facilities of the Bureau of Indian Affairs under the terms of a bill which passed the Senate on July 27.

Both this, and a bill pending in the house, would permit the Secretary of the Interior to contract for the maintenance and operation of the facilities, as well as the sale.

The bill proposes that the Bureau of Indian Affairs be permitted to dispose of utility systems, on terms favorable to the government, for which it does not have funds available for expansion and improvement.

Pa. Fraud Law Enacted Curbing Credit Card Misuses

Governor Lawrence signed into Pennsylvania law a bill providing penalties for making fraudulent use of credit cards or obtaining telephone service through fraud.

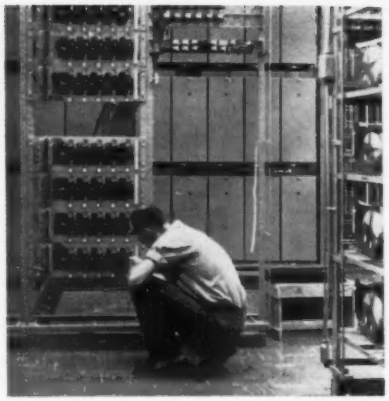
Under the new law, penalties are graduated upward, depending on the amount of service received illegally, to a $500 fine and one year in prison.

The governor said the measure was necessary because of the increased use of credit cards for all types of purchases.

General Introduces PPCS To Southern California

The initial PPCS (person-to-person, collect and special services) installation in southern California is serving the Pomona exchange of General Telephone Co. of California. Pomona is a toll center (Class 4 office), serving approximately 23,000 stations, and is

Operator at PPCS (person-to-person, collect & special services) board with display of ticketer number and calling number in General of California's Pomona exchange. A key also permits the operator to put the calling number on the display.



Position hunters and ticketer hunters. A General Telephone Co. of California switchman checks a phase of the special AE switching equipment.

equipped with Automatic Electric Type "A" SATT equipment having Director register-senders, and Automatic Number Identification.

Although it is a suburb of Los Angeles, Pomona's traffic is all-detail-billed; this is one reason it was selected for the initial installation of PPCS. This installation was specifically intended as a pilot, for study of various possible service and operating features.

With PPCS, the customer simply dials one more turn—"O" in the case of Pomona—than he does for an ordinary Direct Distance Dialing call. After he has completed dialing the essential 11 (or seven) digits, the PPCS operator enters the line, and he has only to tell her the name of the person he wishes to speak to (if it is a person-to-person call), or his name (if he desires to make it a collect call), or his credit card number, or the number he wants the call billed to in a "bill-third-party" call.

For the person-to-person and collect calls the necessary information for billing is recorded automatically—calling number, called number, date and time of call, duration of call—the PPCS operator simply annotating, with the equipment at her disposal, which type of call it is.

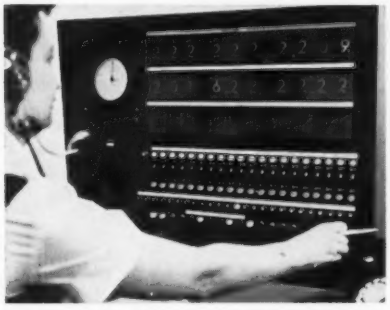
For credit-card and bill-third-party calls, mark sense cards are employed; these are later matched, by means of data processing equipment, with the information stored in the recording tapes.

PPCS operators' positions are cordless, with call distribution through Position Hunters. Each position has a 10-digit display panel, on which can be displayed any of the information that has been previously stored in the ticketer. When a position is seized, the operator receives a tone and a lamp

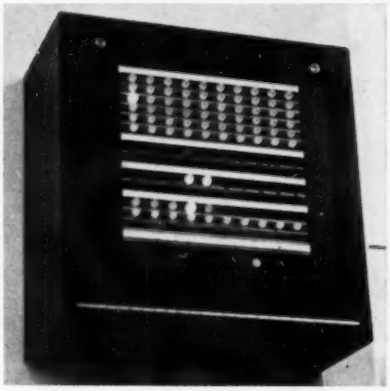
signal. A tone is also heard by the calling customer, who at this signal passes his instructions to the PPCS operator.

On a "person" call, the customer need merely give the name of the person desired. The operator remains on the connection only until certain that this person has been reached; the display panel is not used.

In other cases (e.g., "third-party" calls) the operator must write up a mark sense card; she learns the calling number, called number, and ticketer number, as desired, by operating the proper key and reading the number on the display panel. She has facilities for "time start" control, to start timing of the conversation and to interrupt timing in the event of an error (e.g., wrong party); she also has means to release the forward toll connection so that a toll circuit is not being occupied while new customer instructions are being received, or toll operator reports recorded.



Service observer at a special PPCS observing set, showing called and calling number. (For display purposes the numbers in this photo are fictitious.)



Display panel for supervising PPCS operation.

On this pilot installation, exceptionally complete service-observation facilities were provided. The observer can not only hear conversation but, by key operation, can display the calling number, and the called number and ticketer number. A wall-mounted display panel is also provided for the supervisors; its display includes call-waiting lamps. It has been found that service-observation facilities are particularly valuable in connection with PPCS service.

Installation of the PPCS equipment at Pomona was begun in November, 1960. With 10 cordless PPCS positions, it serves some 18,000 customers.

Wis. Lineman Electrocuted

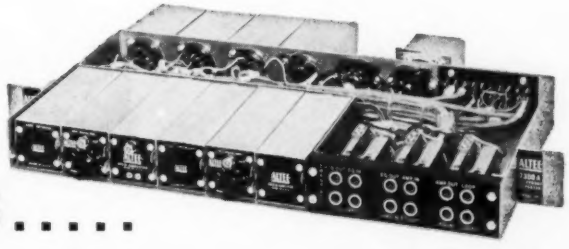
A Milwaukee lineman employed by Wisconsin Telephone Co. was electrocuted on Aug. 15 while erecting a pole in West Allis, Wis. The victim, Cameron D. Drake, 25, was a resident of West Allis. According to a report from the Milwaukee County medical examiner's office, Mr. Drake was leaning against a truck when 4,800 volts of electricity arced from a high tension line to the truck's boom. He was pronounced dead at the scene.

Kansas Company Chartered

The White City (Kan.) Telephone Co., Inc., has been granted a charter. William Hallmark has been named resident agent, it is reported.

2—4/4—4/2—2

SAVE TIME & SPACE WHEN ESTABLISHING REPEATERED VF TELEPHONE CHANNELS . . . . .



Altec 7300A Telephone Repeater Terminating Unit comes wired for rapid assembly of three repeater systems!

• power and space economy • superior performance • minimal heat generation • eliminates 130 v supply • reliability • plug-in modularity • simplified installation

The Altec 7300A TRTU provides rapid means of establishing repeatered VF telephone channels for general telephone, telegraph, teletype circuits, and PBX installations. The 7300A comes fully wired to receive plug-in type Altec circuit components that may be easily assembled for one of three telephone repeater systems: two-wire to four-wire termination, four-wire intermediate, two-wire to two-wire.

The compact unit occupies only 1¾" rack height on standard 19" channel relay rack. An insulated jack strip with 12 jacks permits routine system testing. Transistor amplifiers within the unit are energized by local battery or either 24-26 or 48-52 volt special power supply. 130 volt supply is not required.

The 7300A and the entire Altec line of plug-in repeater amplifiers, equalizers, networks, transformers, relays and pads is available for speedy delivery, normally from stock. For technical details and schematics on the 7300A, write for FREE Bulletin #13783-1, Dept. TB-8.

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2 **STAY ON THE JOB LONGER** ...all wearing parts replaceable in the field; no down-time for shop welding.

3 **COST FAR LESS TO MAINTAIN** ...reversible teeth cost only 90¢ each, pilot bit only $8.00. Parts interchangeable on all PENGO augers you are using...less inventory!

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13-B

PETERSEN ENGINEERING CO., INC.
Santa Clara, California

NEW DEVELOPMENTS IN TELEPHONY

Continued from page 38

duct units. It is manufactured with a tenon on each end for joining by means of a polyethylene coupling and dowel pins. The handling qualities of this type of conduit are essentially the same as for the Bell and Spigot except that the rate of installation will not be as fast.

Plain End.

Available in 2-4-6-8 and 9 duct units, this conduit is manufactured with plain ends to be joined with dowel pins and mortar bandages. This design is offered to users who wish to continue with the mortar bandage type joints, and at the same time obtain advantages in material costs and job site deliveries. The installation rate is equivalent to that for other types of butt joint conduit requiring mortar joints.

Except where fluid soil conditions exist, multiple-duct concrete conduit requires no concrete base. Concrete encasement for tops or sides is said not to be required due to the great crushing strength developed by this product. Breakage during transportation and handling is reported to be less than one per cent. The units are strong and their resistance to shock loads is quite high. Due to the low breaking factor, job requirements can be estimated more accurately.

A smooth bore is obtained by mechanical honing to prevent damage or abrasion to the cable sheath. Field tests have proved, Gagne says, that the coefficient of friction of concrete conduit under actual field conditions is as low as any of the other types of conduit materials.

•

Frequency Selective Voltmeter. (Fig. 83.) Sierra's frequency selective voltmeter, Model 125B-CR, is claimed to be accurate, sensitive and versatile. It is not only a tunable voltmeter operating over a range of 3000 cps to 620 kc, but also a broadband, ac vtvm that is flat ±0.2 db between 1 kc and 620 kc.

As a frequency-selective voltmeter, this instrument is continuously tunable over its entire range by a dial having a scale length of over 40 inches. An up-converter of advanced design and a high intermediate frequency are reported to virtually eliminate spurious responses. Special crystal lattices provide steep-skirted i-f bandwidths of either 250 cps for analyzing complex waves or 2.5 kc for general carrier system measurements.

When this instrument functions as a flat ac vtvm, its measurement accuracy is better than ±0.5 db for all signal levels within its capacity. This characteristic makes it useful for setting the levels of the voice frequency portions of a carrier communication system.

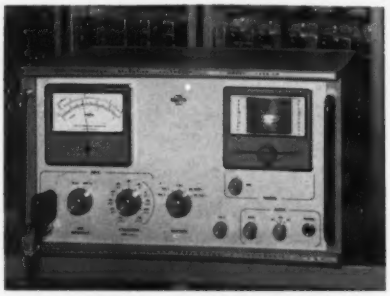

Fig. 83. Frequency selective voltmeter.

Designed for use with either 600 or 135-ohm transmission lines, the bridging loss introduced by the instrument is less than 0.25 db throughout its useful range. When placed across 600 or 135-ohm lines signal levels are read directly as dbm. Direct voltage readings are possible with 600-ohm lines. Eleven levels of attenuation permit precise readings on a selective frequency basis from 24.5 microvolts to 30 volts (—90 dbm to +32 dbm). Five attenuator steps are provided for flat vtvm measurements from 24.5 millivolts to 30 volts (—30 dbm to +32 dbm).

All except the heaviest components are mounted on etched glass-epoxy circuit modules. This technique is said to result in reduced drift because all heat-producing circuit elements are located above the chassis. Additional measurement accuracy is afforded by a built-in 100 kc crystal calibrator.

The model 125B-CR also provides carrier reinsertion for use with single sideband equipments by means of an LS-AM-US selector switch located on the front panel. Either the upper or lower sideband signals of suppressed carrier systems can be detected by means of this selector switch. In addition, this instrument provides a standard am position for detection of amplitude modulated signals.

(To be continued)

Establish Roadblock

There is nothing inevitable in the progress of Communism. It will advance or be defeated in proportion to the virility of the philosophy and way of life which opposes it. We must therefore put our minds and sinews to blocking the roads to international Communism.—EARL OF HOME.

Thirty-one Hawaiian Telephone Co. engineers and plant men and representatives of the Army, Navy, Air Corps and of various manufacturers recently attended a transmission symposium conducted by the Communication Equipment & Engineering Co. at the Hilton Hawaiian Village in Honolulu. The symposium, under the general direction of J. W. Wilkinson, staff services supervisor of the Hawaiian Telephone Co., was conducted on July 5 by R. A. Clark Jr., president, and K. C. Gillette (at rostrum), sales manager, of CEECO.

Communications Industry Cited by Security Analysts

The investment appeal of the communications industry for security analysts has risen dramatically over the past two years, according to a study by Opinion Research Corp.

The study, a project of ORC's Public Opinion Index for Industry, was the second in a series focusing on the investment image of leading corporations and industries. Some 671 security analysts in financial centers across the country provided over-all industry assessments. Detailed appraisals on each

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GHO special services to telephone companies

More than 60 years of service in every phase of telephone operations and construction back up Gustav Hirsch Organization, Inc., in the following special services:

— Appraisals of communication system properties
— Representation of telephone utilities in rate matters
— Preparation of depreciation and plant replacement schedules
— Years-ahead master planning of telephone service
— Preparation of Pro-Forma operating statements to aid in financing expansion and rehabilitation programs

GHO
GUSTAV HIRSCH ORGANIZATION, INC.
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industry were provided by 50 analysts specializing in that industry.

One analyst in two named the communications industry as one of the most attractive industries in terms of growth possibilities over the past five years, compared with one in seven in a 1958-59 study.

Diversification into electronics and participation in normal population growth contribute to the increased attractiveness of communications industry securities.

Analysts feel that increased emphasis on communications via space, plus the use of data processing equipment and automation, will have an important impact on future growth.

In addition, normal population growth is seen as contributing to the steady expansion of the traditional segments of the industry's business.

Major limitations on growth, in the opinion of analysts, are governmental regulation, the high costs of research and the communications industry's heavy capital requirements.

Data on Latin American Equipment Market Available

The Business & Defense Services Administration, U. S. Department of Commerce, announced on Aug. 18 that the country-by-country telecommunications survey of Latin America, initiated earlier this year to determine actual and potential markets for U. S. telecommunications producers, has been partially completed.

C. F. Fiore, BDSA's telecommunications projects advisor for Latin America, assisted the U. S. Foreign Service Posts in the collection of essential data for Trinidad, Mexico, Jamaica, Surinam, Uruguay, Paraguay, Venezuela, Argentina, and Bolivia.

BDSA is not issuing a formal publication, but is prepared to make the available information on these countries accessible to those American producing companies which are interested in, or engaged in, exports of communications equipment.

Maser's Inventors to be Honored by Franklin Institute

Dr. H. E. D. Scovil, a Bell Telephone Laboratories Engineer at Murray Hill, N. J., and Dr. Nicolaas Bloemberger, physics professor at Harvard University, are to be awarded the Stuart Ballentine medals of the Franklin Institute on Oct. 18.

The two scientists are to be honored for "the invention of the three-level, solid-state maser and its subsequent development for practical use in the reduction of noise in communication systems" from telephones to receiving stations for satellite signals.

Kappel Named AT&T Chairman; McNeely President

Frederick R. Kappel, president of American Telephone & Telegraph Co. for the past five years, was elected chairman of the board at a meting of the company's board of directors on Aug. 16.

F. R. KAPPEL

Mr. Kappel will continue to be the chief executive officer of the company.

Eugene J. McNeely, executive vice president, was elected AT&T president, and W. C. Bolenius, executive vice president, was elected vice chairman of the board.

E. J. McNEELY

James E. Dingman, vice president and chief engineer, was elected to succeed Mr. McNeely as executive vice president.

The board also elected Claude M. Blair vice president with responsibilities for AT&T's space communications programs. Mr. Blair formerly was

staff vice president of Pacific Northwest Bell Telephone Co.

The AT&T board announced that these changes were being made "to more effectively meet the increasing complexities and long-range growth of business."

ITT Picks Stradwick for Far East General Manager Post

The appointment of Charles Stradwick, one of Australia's government leaders in telecommunications, as area general manager-Far East for International Telephone & Telegraph Corp., was announced on Aug. 4 by Harold S. Geneen, ITT president.

Mr. Stradwick, who is resigning as Director-General of Posts & Telegraphs for the Australian Post Office, also will serve as vice president of International Standard Electric Corp., which includes all the principal research, manufacturing and sales organizations of the ITT System outside the United States. He will assume his new duties on Oct. 1, with headquarters in Hong Kong.

Mr. Geneen said, "Our company considers itself most fortunate to have been able to enlist the services of Mr. Stradwick in this key post. Not only is he eminently qualified, but it is proper that the responsibility for executive management of our growing business in this part of the world go to an Australian citizen who has served his country well, and can now serve the entire region of which Australia is such an integral part."

For 41 years, Mr. Stradwick has been associated with the Australian Post Office.

He has been chairman of the Overseas Telecommunications Commission (Australia) since August 1960. In this capacity he has been closely identified with development of proposals for the new trans-Pacific telephone cable from Canada to New Zealand and Australia, on which work will soon commence.

As Director-General, Mr. Stradwick directed many changes in the Australian Post Office operations, including introduction of modern switching equipment, greater use of automatic systems, installation of "wide band" cable and radio systems, and mechanization of both the telegraph and mail services.

He was chairman of the Olympic Games Communications and Broadcasting Committee in 1956 and was awarded the Order of the British Empire by Queen Elizabeth in 1957.

Basis of Knowledge

"He who knows himself knows others."—COLTON.

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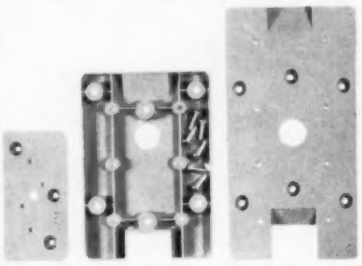

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SMALL COMPANIES AND LIBERALIZED DEPRECIATION

Continued from page 26

jority may follow "flow-through," but that a considerable minority, perhaps five, six or seven, might be expected to adopt "normalization" treatment in some form. Accordingly, small companies located in states where the issue is still undecided would seem wise in adopting liberalized depreciation, if they have not already done so, in the hope that the commissions having jurisdiction in their cases may resolve for the "normalization" method.

Situations Considered

This is particularly true where there appears to be reason to believe that the commissions are inclined in that direction. Regardless of the ultimate commission decision, the company would benefit from adopting liberalized depreciation by enhanced cash income during the period before the decision was reached, and, as more fully described below, even thereafter until a rate proceeding involving the company was instigated, if the commission decided for the "flow-through" procedure.

But while the principal benefits from liberalized depreciation should accrue to those small telephone companies situated in states which have adopted "normalization," and, to a lesser degree, to those companies in states where a decision is pending, this does not mean that small telephone companies located in states where "flow-through" has been adopted, or seems likely to be in the near future, cannot also derive benefit from the adoption of liberalized depreciation.

Reasons for Liberalized Method

There are several reasons why the existence or threat of "flow-through" need not discourage the adoption of liberalized depreciation. First, there has been a general tendency to feel that if the additional income from the reduction in income taxes from this source is to be treated as additional income for rate-making purposes, and handed back to the consumers, then no purpose is served in adopting liberalized depreciation. Surely this is strange reasoning, for, on the same basis, it should be considered equally useless to take on any more business, or to attempt to effect any savings in operating expenses or other items, since, in all these cases, the result will increase income for rate-making purposes. The fact that savings from reductions in expenses or income from new business may have to be passed on to consumers in a rate case has never yet been considered as making it futile to obtain such savings or new business. It would seem that the same approach should apply to a tax reduction from liberalized depreciation.

Secondly, and more important, it must be borne in mind that the increased income "flowing through" as a result of tax reductions from liberalized depreciation will be passed on to consumers only if and when there is a rate proceeding involving the particular company in question. Therefore, the time when the company is likely to lose the benefit of increased cash income from this source varies with the situation of the individual company with respect to the imminence of a rate case.

Where the company is, itself, planning to request a rate increase, or where the rate of return is sufficiently high to indicate a possibility of the commission instigating an adverse rate proceeding in the near future, then the odds would be that the company would probably not be able to retain long the increased cash income.

Cash for Number of Years

But where there are no prospects of either a rate increase or rate reduction proceedings in the foreseeable future, the utility can adopt liberalized depreciation with a reasonable expectation that, at least for a number of years, it can retain the benefits of the higher cash income arising from this source. The difficulty of commission staffs handling the necessary paper work incident to instigating rate cases against any considerable number of small companies should, in many cases, operate as an added protection against the transfer of the benefits of liberalized depreciation to the company's customers through rate proceedings.

No statistics are known to the writer as to the number of small telephone companies which have adopted liberalized depreciation, or what proportion they would bear to the total of all such companies, but recent surveys indicate that in the case of electric utilities, 20 to 25 per cent of all such systems have still failed to adopt this provision despite the many advantages to be derived therefrom.

There is also another reason for adopting liberalized depreciation where there seems a reasonable chance of obtaining a semi-permanent benefit therefrom, although "flow-through" applies. This reason is that certain state commissions, notably New York, have expressed the policy that, in rate-making, they will compute the utility's income as if it had the benefit of reduced taxes

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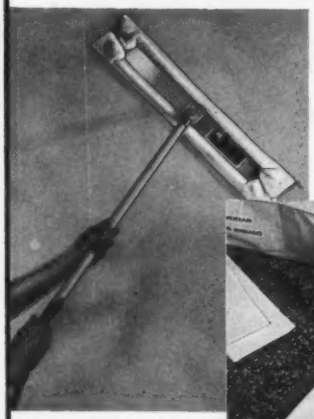

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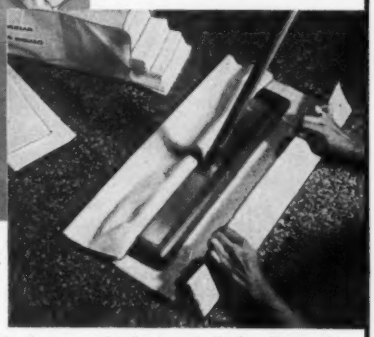

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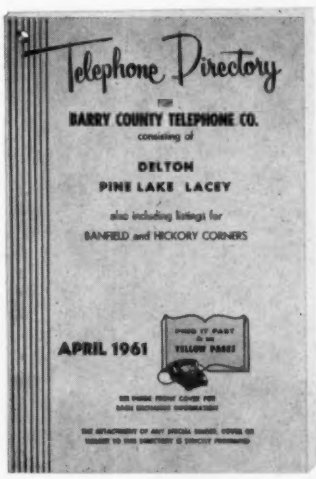

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from liberalized depreciation, even where the utility has not actually adopted this provision. Therefore, small telephone companies located in states where such a policy prevails, or where there is reason to believe adoption thereof is being considered, should take it into serious consideration in reaching a decision as to whether or not to adopt liberalized depreciation.

For the reasons given above, the adoption of liberalized depreciation seems particularly advantageous to small telephone companies, first and foremost in the case of those companies located in states where commissions have already adopted "normalization"; secondly, in those states where there is reason to believe the commissions are likely to adopt that treatment; thirdly, in states where no decision has yet been made and there is nothing to indicate what the regulatory bodies are likely to decide; and, finally, to a lesser degree, even in those states which have adopted or threaten shortly to adopt, the "flow-through" method.

ABC OF THE TELEPHONE

Continued from page 24

Fig. 7, is hauling a heavy load around a sharp curve and up a good grade. This is a severe test of truck performance. The engine is in top running order as indicated by the absence of smoke at the exhaust which is visible on the left of the truck.

Another thought to keep in mind is that public health authorities recognize that diesel exhaust has low toxicity (low in poisonous content). This is an important consideration in confined and congested areas. Many people, however, do not know, or will not accept, the fact that diesel exhaust has low toxicity. This would indicate the need for some public relations activity in helping the public in general gain a better understanding of this advantage of the diesel engine.

Perhaps the most chronic violator of the rules of good public relations is the occasional smoking diesel truck rolling along a street or highway. The excess smoke causes a reaction in many people like the reaction caused by waving a red flag in front of a bull. Again, the answer to the smoking diesel is good maintenance.

Diesel Maintenance

Keeping the diesel engine in good maintenance condition is basically the same as maintaining a gasoline engine. For that matter, diesel engine maintenance is comparable to maintaining the various electrical, mechanical, and electronic components of a modern communications system.

In diesel engine maintenance, certain tolerances, procedures, and requirements are established by the manufacturer for the various components. The engine can be restored to optimum operating condition by restoring the components to meet these specifications.

Adjustment of the fuel injectors is the most critical item in diesel engine maintenance. Experienced diesel mechanics follow the manufacturer's specifications in adjusting fuel injectors snug to the highest point of the cam lobe. This insures that the fuel will be expelled completely from the injector cylinder. Experience has also shown that the best practice is to install the injectors properly and run them until replacement is necessary.

A low pressure transfer pump is used to deliver the fuel from the supply tank to the fuel injectors of the diesel engine used in the new medium duty trucks. The single unit performs all the functions of building pressure, metering, atomizing, and injecting the

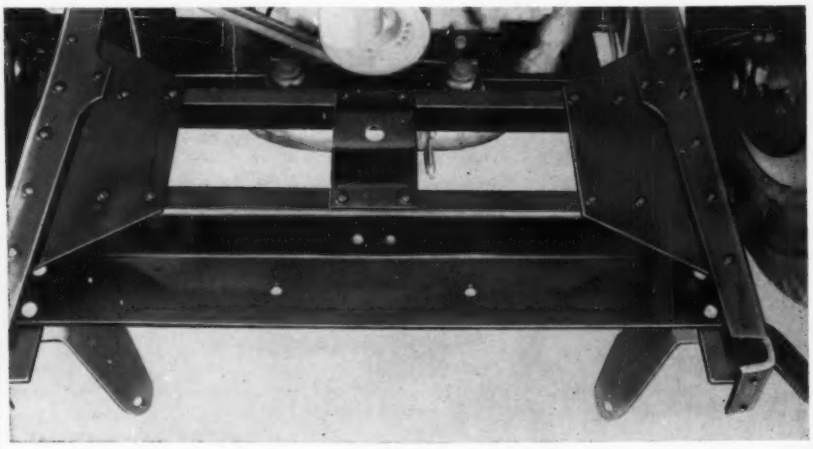

Fig. 8

fuel. As a result of this concentration of precision functions in the injector fuel pump, maintenance is simplified.

Most diesel engines incorporate a fuel filtering arrangement. The filtering system improves engine performance by removing water and dirt from the fuel supplied to the cylinders. In most instances, the filtering arrangement consists of a sump inserted at a low point in the fuel system to remove water and condensation and a filter element to remove dirt and metal particles. Some filters incorporate a sump as part of the filter housing. Water is removed from the sump by removing a plug in the bottom of the filter or by opening a pet cock when one is provided.

The fuel filter may be the element type using a replaceable cotton or wool element as the filtering agent. Another type filter has a laminated core operating against two cleaning blades. This type filter usually is located where it is convenient for the driver. Once each day the driver turns the handle of the filter to clean the interior laminations. Once a week, during the regular service routine, the filter handle is turned and a drain cock is opened to drain the sump.

Most diesel engines use replaceable cylinder liners to simplify cylinder and piston maintenance. As a rule, piston and cylinder liners are measured and replaced if the following wear is found:

Sleeves—0.008-inch.
Pistons—0.0025-inch wear of groove and ring land.

If the pistons and sleeves still are serviceable, cylinder maintenance is completed with the installation of new piston rings.

Crankcase maintenance and cooling system maintenance of a diesel engine are practically the same as with a gasoline engine equipped fleet unit. Crankcase oil should be changed at regular, frequent intervals to keep engine wear at a minimum. The cooling system should be clean and tight to prevent coolant loss and to permit complete circulation in the system.

The diesel compression-ignition principle eliminates the need for a sensitive electrical ignition system, which is the cause of about 18 per cent of road failures in truck operations. This feature alone has important advantages in reducing the maintenance cost of diesel equipped medium duty trucks in the telephone fleet.

Assembly Has Advantages

Assembly equipped diesel trucks are designed and built with special heavy duty components for maximum diesel performance. A typical example of the heavy duty construction used are the cross-members and reinforcements on the front of the frame shown in *Fig. 8*.

The new assembly installed diesel engine trucks may add a new dimension in economical operation for the medium duty trucks required in the telephone field. In the face of continually increasing operating costs, these new trucks might well prove a welcome future addition to many of the long-haul or pick-up and delivery services handled by the telephone fleet.

Hardy Is USI Sec.-Treas.; Peyton to Switchboard Sales

The United States Instrument Corp. has announced the appointment of W. Clyde Hardy as secretary-treasurer. He is the former corporate controller.

W. C. HARDY

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Mr. Hardy has been with USI since 1957. He is a native of Richmond, Va. and a graduate of the Richmond Professional Institute. He also completed

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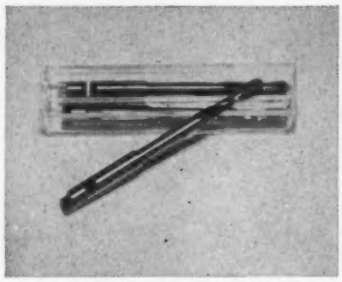

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graduate work at the University of Richmond.

His professional experience includes positions with Reynolds Metals Co., Williams & Reed, and with the Virginia Corporation Commission.

Mr. Hardy also served for three years with the U. S. Navy during World War II.

In his new capacity, Hardy will work directly with USI's president, William A. Rockwood, and will exercise full control over all corporate financial matters.

Also announced by the United States Instrument Corp. is the promotion of Jack M. Peyton from sales engineer to switchboard sales manager.

Mr. Peyton is a native of Atlanta, Ga., and a Phi Beta Kappa graduate of Washington & Lee University, Lexington, Va.

His Signal Corps service during World War II was followed by four years with the Lexington (Va.) Telephone Co. as central office supervisor.

He joined USI in 1955.

Portable Paystation Used By Hospital at Bedsides

The Churchill County Telephone System, Fallon, Nev., has brought a new communications service to its community.

The service permits hospital patients to make private and convenient telephone calls on a pay-as-you-call basis without leaving their beds by bringing an ITT Kellogg K-580 portable paystation to them.

Maintenance of office records for patient telephone charges is eliminated; also bothersome in-coming message carrying by hospital personnel.

The new system is now operating successfully in the Churchill Public Hospital at Fallon. ITT Kellogg officials believe it is the first system of its kind in the country, but that its simplicity and efficiency could prompt widespread use, particularly by hospitals without existing bedside telephone facilities.

The Churchill Hospital installation was designed and installed by Kenneth Covertson and Louis McGruder of the Churchill County Telephone System.

First, all rooms of the hospital were wired and equipped with a telephone jack. Next the ITT Kellogg K-580 paystation was mounted on a small cart so that it could be easily wheeled from room to room.

Now, when a patient wishes to make a call, the paystation telephone is wheeled to his bed, plugged into the nearest telephone jack, and it is ready for use. The patient makes his call and pays for it when completed.

The portable paystation can be easily secured to any horizontal plane and features top-mounted handset and top-mounted coin slots.

Sylvania Establishes Microwave Device Division

Sylvania Electric Products Inc. on Aug. 17 announced the formation of a new operating division, the Microwave Device Division, to meet the rapidly expanding demand for complex "electronic age" components. Sylvania is a subsidiary of General Telephone & Electronics Corp.

Gene K. Beare, president of Sylvania, said that W. Herbert Lamb had been appointed vice president of the new division. Prior to his new assignment, Mr. Lamb had headed the microwave device operations and the picture tube

A young patient at the Churchill Public Hospital, Fallon, Nev., uses a portable paystation telephone brought to her bedside. The new service, installed by the Churchill County Telephone System, utilizes an ITT Kellogg K-580 paystation.

operations within Sylvania's Electronic Tube Division.

Microwave devices are the essential components that generate, amplify, and detect the microwaves used in link communications, such as the telephone and television links across the United States; radar; countermeasure equipment; satellite communications systems of the future, and many other types of sophisticated electronic equipment. Microwaves are radio waves that vary in length from 6 inches down to about 1/16th of an inch, compared with lengths ranging from 1/4 to 1/10 of a mile for ordinary radio waves.

Mr. Beare said that it was decided to establish Sylvania's microwave device activity as a separate division because of "its recent rate of expansion of both volume of sales and product line —expansion that is expected to accelerate on a continuing basis throughout the foreseeable future."

"It has been estimated that the sales volume of the microwave device industry totaled about 200 million dollars in 1960, and by the end of 1965 will be at least double that figure," the Sylvania chief executive stated.

Dunleavy Succeeds Graham As RCA Division Manager

The appointment of Francis J. Dunleavy as general manager, Communications and Controls Division, Radio Corp. of America, was announced on Aug. 7 by Theodore A. Smith, executive vice president, RCA Industrial Electronic Products.

Mr. Dunleavy, formerly general manager, Industrial Controls, joined RCA in 1959 as general manager of the Industrial and Automation Division. In his new position, he will direct the activities of communications products and microwave departments, the Detroit industrial and machine tool department, and the graphic arts products and aviation equipment departments.

Mr. Dunleavy succeeds John J. Graham, recently named to the newly-created position of division vice president, operations, RCA Electronic Data Processing Division.

Before becoming associated with RCA, Mr. Dunleavy was with Yale & Townsend Mfg. Co., Philadelphia, for eight years. He served as general manager of the Materials Handling Division and was responsible for sales, engineering, manufacturing and labor relations activities. He had been employed previously for six years as assistant controller of the American Pulley Co., Philadelphia.

Graduated from Niagara University with a degree in business administration, Mr. Dunleavy joined the Bendix Aviation Corp., becoming chief cost accountant of its Philadelphia operations, a position which he held until 1956.

Mr. Graham, Mr. Dunleavy's predecessor as general manager, had held this post since May, 1960. In his new position, he will be responsible for commercial systems operations, data communications and custom projects and industrial computer systems.

India Reports Expansion, New Zealand Tells Plans

India now has approximately 460,000 telephones, compared with 260,000 at the end of the country's first five-year plan in 1955-56.

Up to November, 1960, Indian Telephone Industries Ltd., Bangalore, produced 363,172 telephones and 223,585 exchange lines during the second five-year plan (1955-56 to 1960-61).

By the end of the third five-year plan (in 1965-66), annual production is expected to reach 180,000 telephones and 130,000 exchange lines plus transmission equipment.

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In New Zealand, almost 4 million pounds will be spent on improving and extending telephone service in Auckland in the next five years. The existing metropolitan network of 80,000 numbers will be increased to 133,000.

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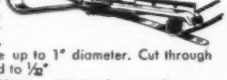

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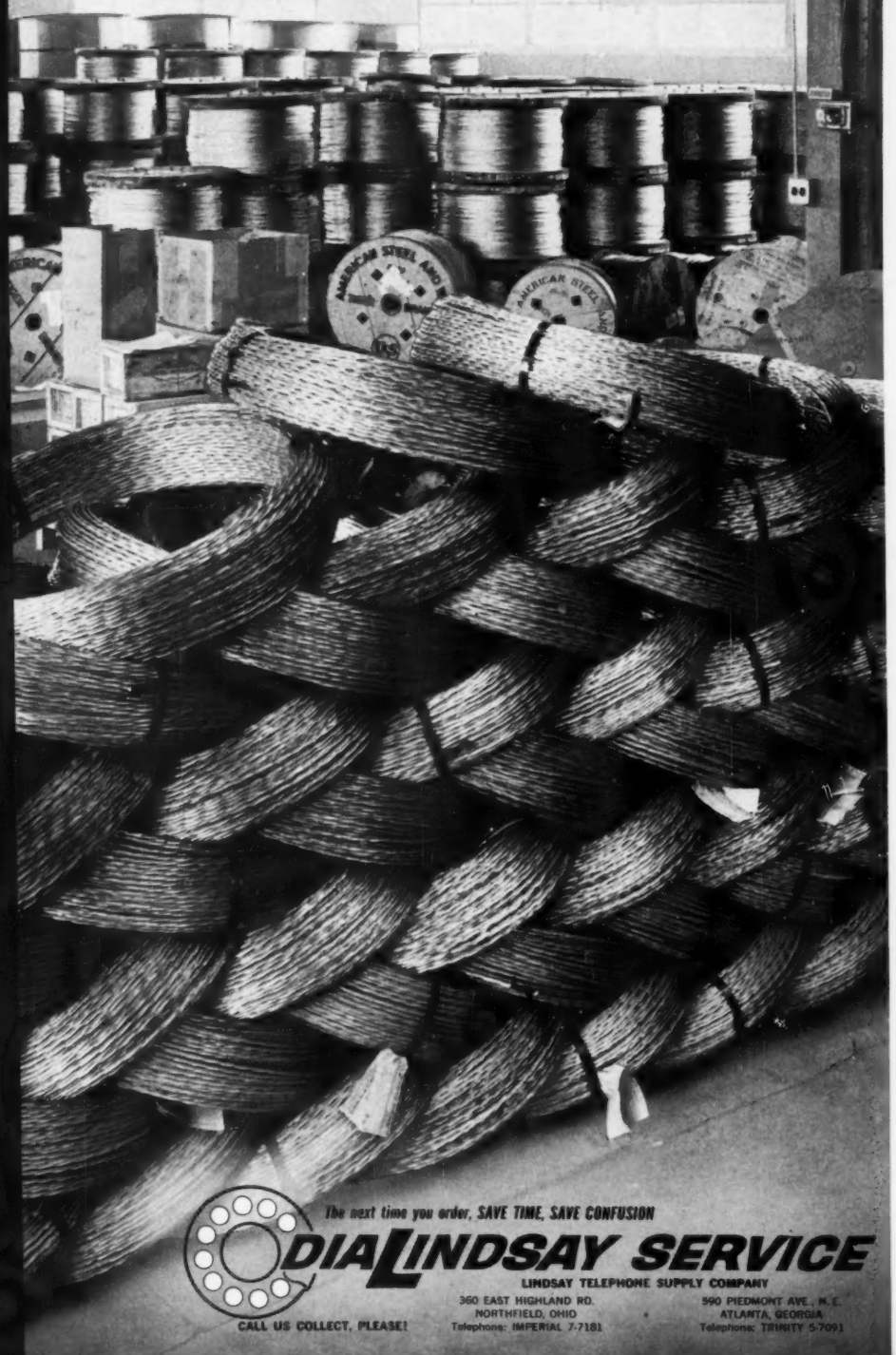

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